

TRANSPORT GEOGRAPHY OF THE BUNDELKHAND REGION (U. P.)

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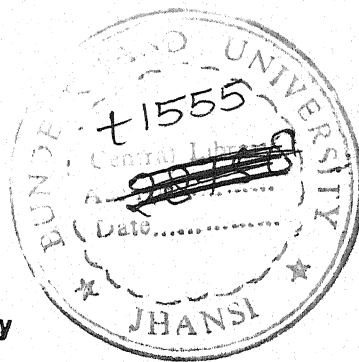
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the economic development.

Transport, a man-made resource is the switch board of the whole apparatus of economic development. It leads an importance of raising the standard of living and solving the socio-economic problems. Thus, it may be said that transport is a form of capital good, just as a piece of factory equipment, which can be used to produce a service between the demand and supply regions. The magnitude of flow of materials is determined by the structure of transport system. The technological characteristics and spatial lay out of net-work of every means of transport vary from each other at least to some extent. It examines how far the physiography and technology have been fruitful in creating a climate of transportation in the regional economy of the Jhansi Division, specially in rural areas. Any change in spatial pattern of transportation system leads to far-reaching effects on the efficiency of the economy and the structure of territorial economic complexes and hence a thorough study of all aspects of transportation is very essential in order to suggest a scheme for a balanced economic development of region. The present study attempts to provide an integrated study of the transportation

geography of Bundelkhand Region (U.P.).

In fact, it is a part of the scheme and launched in the year 1992-- under the able guidance of my supervisor. The main aim of this scheme is in two ways, one presenting the analysis of major physico-economic and socio-cultural factors responsible for transportational backwardness of the region, and the other the planning of transport-network, made for the integrated regional development.

METHODOLOGY :

This study will play a significant role specially in the rural transport for economic development of the region which is based on an empirical study. The researcher has carried out an extensive field work and collected the latest available proper data concerning the natural, social and economic aspects of the study region. The data have been found from the various government departments such as Regional Directorate of Transport, Statistics Office, Block Development Office, Tahsil Head Quarters, Directorate of Industry, Private Sectors, etc.

Mapping and diagrams of the surveyed area

represent an additional approach in this empirical study which will be more useful to chalk out the future transport development programmes and plans on appropriate grounds.

The collected data were processed and analysed to present the results incorporated in the thesis which, it is hoped, will be of some value not only for geographers but also those in allied social disciplines, economists, administrators, country-planners and specially transport-planners who are engaged in planning formulation of agricultural schemes, industrialisation and the other uplift programmes. To the best of his ability the author has put forward valuable suggestions for tackling various regional problems.

STRUCTURE :

The present study is necessarily a regional monograph portraying the inter-relationship between the transport and development in Bundelkhand Region (U.P.). It, therefore, resorts to the common format starting with the physical setting. The thesis has been divided into ten chapters.

Chapter first comprises the spatial

relationship, geology, surface configuration, drainage, climate, soil, vegetation, industry and population which give a detailed picture of the physical and cultural settings of the region to which the patterns of various transportation features are closely inter-linked. The emphasis is put on the features that have some direct bearing on transportation. The remaining chapters are devoted to the analysis of the different transportation features.

Chapter II surveys the evolution of transport since ancient period upto the recent, which gives a clue to the various historical forces that have moulded the existing transport network.

Chapter III Points out a systematic and analytical survey of the transport arteries and investigates their distributional pattern, characteristic, density, distribution, incidence of population and water and air transport. A distinct method is used to represent the density and distribution of both the rail and road in different are as of the region.

Chapter IV contains the nature of accessibility, its types, activeness of transport cover and connectivity of the transport regions.

The concept of relative accessibility utilised in, represents the real degree of accessibility in various regions.

Chapter V is devoted to a detailed analysis of the nature and flow of rail-road traffic. In spite of serious dearth of data, experienced by all transport geographers, the author has fairly succeeded in bringing out distinctly the density, structure, transportational features, origin and destination of traffic. For this purpose, the scattered information has been obtained from various sources, makes it more valuable. To depict the matter the proper cartographic techniques and methods have been used. The analysis of road **traffic** flow is based on a report of volumetric survey. At the end of this Chapter due emphasis has been made for the sharp problems of competition.

Chapter VI deals with the urban transport in general. Its positive and negative role have been examined with suitable examples. Under this, it is included a brief assumption of the character of urban transport as disclosed by some typical towns. The intensive field observation and the traffic survey of Jhansi have been made easy to find out the general transport problems of urban land.

Chapter VII portrays the various aspects of rural transport such as the density of unmetalled roads, means of conveyances, types of markets and their distribution, pattern of rural traffic flow and accessibility of villages from metalled road and 'hat' or market, have been analysed with extreme care. The nature and amount of the important commodities in the main markets, have been clearly dealt with.

Chapter VIII deals with the transport and tourism in general. Various aspects of this Chapter viz; importance of transport in tourism, land transport and tourism, water transport and tourism, economic aspect of tourism and some interesting tourist places have been analysed with utmost anxiety.

Chapter IX examines the transport and regional development and the role of the existing transport in regional development. It also includes the need for describing transport regions for planning purposes with a brief note on the methods for demarcating such regions. It is followed by the surface configurations of Bundelkhand region (U.P.) into suitable transport regions.

Finally, Chapter X describes the transport problems on regional, urban and rural levels. It also suggests and plans better, to tackle these problems and for improvement of transport in the future.

जगदम्बिका प्रसाद
(JAGDAMBIKA PRASAD)

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जगदम्बिका प्रसाद
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INTRODUCTION

IMPORTANCE OF STUDY

Transport, an important phenomenon of cultural landscape, works as a potent factor for the regional and national development. Any type of development whether economic, social or cultural is based on a good transport network¹. As a factor of production it's availability for the development of an area is essential². It not only fulfils the needs of the people but it also stimulates human-resources for further development. Bruhnes has aptly remarked that "Communications are not only a factor in the physical transformation of the surface, they transform, also, the quantity and aptitudes of human population; they conquer space, space derives its value only from its connection with life; and the progress of communication always takes the form of a more or less conscious recrudescence whether cynical or disguised of the spirit of domination³." Certainly, the cheap, efficient and fast transportation is a dominant factor of our modern industrial and scientific age⁴.

Unlike natural resources transport

is a man-made resource which interacts with men and various commodities of different areas. Transport, therefore, is a form of capital good, just as a piece of factory equipment, which can be used to produce a service.

In the absence of means of transport the regional development cannot get momentum and it cannot enhance the socio-economic conditions of developing countries⁵. In other words without transportational and communicational lines most of economic activities are barred. Consequently, a broad gap in human civilization is created. It is a strong tool for the exchange of views, cultures, traditions, religions etc. In brief, transport eases the movement of man, goods and ideas and just as manufacturing creates 'Form Utility', so transportation creates 'Place utility'⁶. Transport, therefore, is a means to minimise the time and distance in rural and urban, national and international and war and peace lives. This is the first and foremost aim of our national planners to accelerate the pace of development by developing the means of transport, so that the per capita income and living standards can be raised and industrialization and urbanization may be accelerated in national interest. In

short, the form and extent of transport facilities is fairly indicative, like a registering apparatus, of the human and economic development of an area⁷. Like veins, transport artery, is amplified in every part of economic body in which conducts a life of merchantile transport. Transport artery, counts the first importance in economic development of a region⁸.

The Bundelkhand region occupies a central position in the country. The main arteries of Indian transport run across the region. However, it faces the transport problems due to its rugged and undulating topography. Smailes has rightly remarked, "the physical configuration effectively establishing route patterns and indirectly influencing the economy, has naturally a great bearing on the nature and character of transportation⁹. There are some large pockets and several unbridged rivers and streams where road and railway accessibility is lacking. Therefore, such areas have to face a difficulty in importing or exporting of various commodities and raw materials. The Bundelkhand is one of the underdeveloped regions where transport and communicational facilities are inadequate for its economic development.

The above description reveals that

if any nation bears a backward economy, it's progress will be stagnant. Its development needs the enhancement of transport facilities on preferential basis. The Bundelkhand region has an imbalanced and under developed economy due to the under developed means of transportation.

Increase in the faster means of transportation in rural areas must be the prime objective of abridging the gap between the imbalanced development of urban and rural areas. For this purpose one will have to make a deep research in the field of transport network and find out the unsowed areas of the region, so that the imbalances in the regional economic development may be mitigated. Such a research project will be of great use and significance.

The planning of transport network for the regional development is the current need. Without planned transport network the desired goals of the national development can not be achieved. For this purpose a wide survey and analysis of factors responsible for transport-development is an unavoidable need. With the help of research-work the planners will be able to understand the transport frame work, problems and future prospects of the region. For the

fulfilment of the above objective, the suitable schemes for transport development of the region are highly needed.

The development of transport-network is a basic requirement for the integrated development of a region. Till, a planned transport-network does not exist in the region as a whole, its multisided development is absolutely impossible.

With reference to the importance of study at hand, it is necessary to introduce the objectives of the transport development scheme. The scheme aims at presenting the analysis of major physico-economic and socio-cultural factors responsible for transportational backwardness and imbalanced economic development of the area concerned and to suggest some measures for transport-development; so that the socio-economic condition of the people may be improved. Besides making a study of geographical personality, natural resources and general transport- network; a deep study of accessibility, connectivity, identification of inaccessible pockets, quality of transportation, present problems and future prospects for transport development is necessary.

It also aims at studying the prospects of industrial development, encouraged and facilitated by the development of new transport arteries. With the passage of time, new settlements are emerging. To link them with other points new road and rail-reticules will have to be developed. Thus, they provide a matter for future extension of network.

In brief, we can conclude the main objectives of the scheme as under : -

1. To analyse the present means of regional transportation and highlight its problems as well as prospects for the rural and urban development in future.
2. To arouse co-operative attitude among the people for regional transport and communicational development and to seek government assistance.
3. To analyse the natural and cultural elements which are complementary to the transport development.

- 4 . To propose a regional plan of transport development for the proper exploitation of the hidden resources.
5. To minimise the regional transport disparities and to propose a scheme for balanced and integrated transport development.
6. The main object of the scheme is to increase the per capita income, improving living standards and solve the socio-economic problems of the area under study, through scientific development of transport-network.

U.P.Bundelkhand is an under developed region, consisting of five districts e.g. Jhansi, Jalaun, Hamirpur, Banda and Lalitpur, two third part of which is plain and remaining is plateau.

Although the region is under-developed, it is rich in natural resources. If the proper exploitation and utilization of these resources be made possible on the basis of transport provisions, the new prospects for the regional economic development will emerge. Therefore,

the study of transport arteries in terms of its distribution, categorization, characteristics and evolutionary process is necessary for determining the cultural, social and economic development¹⁰.

WHAT IS TRANSPORT :

Transport is the main part of our modern economic machinery. Therefore, it is necessary to understand the meaning of transport. Bamford and Robinson remarked,

"Transport is concerned with a movement of displacement of persons, goods or ideas for some special purpose from one place to another". They further considered this definition in more detail and said, "In economic language, the demand for transport is a derived demand. Transport as such does not really produce a tangible product and the meaning of the word demand in such a situation, is that transport is required not for its own sake but because it is useful in satisfying some other need"¹¹.

In modern age, the regions which are lacking in transport facilities become socio-economically stagnant.

Transport is examined as a form of capital, created by men for themselves only not like natural resources. Because, natural resources can be used physically to produce goods, while transport is used to produce a service¹². In short, it facilitates a means of displacing persons and goods from place to place or satisfying a particular need in first to get to and second to produce a link between the supplier and the consumer respectively.

The transport manages a simple and highly sophisticated service according to the nature of goods carried.

In brief, transport is the main key for all types of development in a region.

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CHAPTER - 1

PHYSICAL AND CULTURAL SETTINGS

For the proper planning of transport network, the study of physical conditions and natural environment becomes necessary. The foregoing analysis presents the physical setting of the region.

A. SPATIAL RELATIONSHIPS :

Spatial relations of a region are concerned with the study of its location in relation to other regions, its astronomical position, area, shape and size. All these aspects affect the growth, development and prosperity of a region in many ways.

GEOMETRICAL POSITION :

The region lies in the central part of India and the Southern part of Uttar Pradesh. It is situated between the Gangetic Plain in the north and the Vindhyan high lands in the south; Baghelkhand in the east and the Gwalior and Malwa regions in the north-west. Astronomically, the U.P. Bundelkhand extends from 24°5' N to 26°30' N latitudes and from

78°10' E to 81° 30' E longitudes (Fig.1.1)

SHAPE & AREA:

The region appears like a triangle with its three appices of Jalaun, Banda and Lalitpur. It encompasses an area of about 29.4 thousand Sq. Kms. and population of about 54.4 lacs (1981), consisting of five districts of Jhansi, Jalaun, Hamirpur, Banda and Lalitpur (table 1.1).

Over the years its geographical location had gotten an unique strategic importance. In the days of political upheaval (12 cent. A.D. to 17 cent. A.D.), it was known as the, "Gate way of South India". Because all the main routes to Deccan Plateau from the Gangetic Plain passed through the region¹. Owing to transportation inaccessibility in the past all the invaders and indigenous rulers were anxious to capture such strategic part of land.

BOUNDARIES :

Historically² and culturally Bundelkhand by and large coincides with its physiographic entity.

TABLE - 1.1
AREA AT A GLANCE

SL.NO.	NAME OF DISTRICT	TOTAL GEOGRAPHICAL AREA (KM ²)	TOTAL POPULATION 1981.	DENSITY OF POPULATION PER KM. ROAD MILAGE	DENSITY OF POPULATION PER KM. RAIL MILAGE	TOTAL POPULATION 1991
1.	Jhansi	5027	1133002	1448	6625	1426751
2.	Jalaun	4549	987432	1299	12041	1217021
3.	Hamirpur	7192	1194114	1490	7703	1465401
4.	Banda	7645	1536349	1288	2681	1851014
5.	Lalitpur	5042	587290	1067	7830	748997
REGION		29455	5438187	1331	7962	6709184

Based on Regional Census of Jhansi, 1981.

According to Cunningham the Bundelkhand region was lying South of the Yamuna extending from the Betwa in the West, to the temple of Vindhyavasini-Devi (Vindhyachal) near Mirzapur in the east³. Similarly Spate⁴ designated its Boundaries as the Southern upland consisting of the Vindhyan rocky zone and Gneissic Bundelkhand.

With the above view an attempt has

* The data to be used are provisional derived from The Regional Statistics Department, Jhansi.

been made to define the area of study mainly on the basis of geomorphic homogeneity, structural unity and climatic uniformity which comprise the basis of cultural unity. It follows the natural guide-lines which distinguish it from the adjacent areas in geological structure and physiographic make-up. In the north the Yamuna coincides from north-west to south-east and in the west and north-west its boundary is marked by the Betwa. Incidentally, the Chandela Empire never extended beyond this line⁵. In the South Lalitpur Plateau demarcates the boundary line of the region and further, in the south east skirts of the region runs along the Bundelkhand upland or Vindhya ranges separating the region from the Baghelkhand.

Beside these delimitations, politically, the region lies under the Uttar Pradesh State, consisting of five Southern districts i.e. Jhansi, Jalaun, Hamirpur, Banda and Lalitpur.

B. GEOLOGY :

The Geographical surroundings of the study region contributes their share in geological structure of the area in many ways. The nature

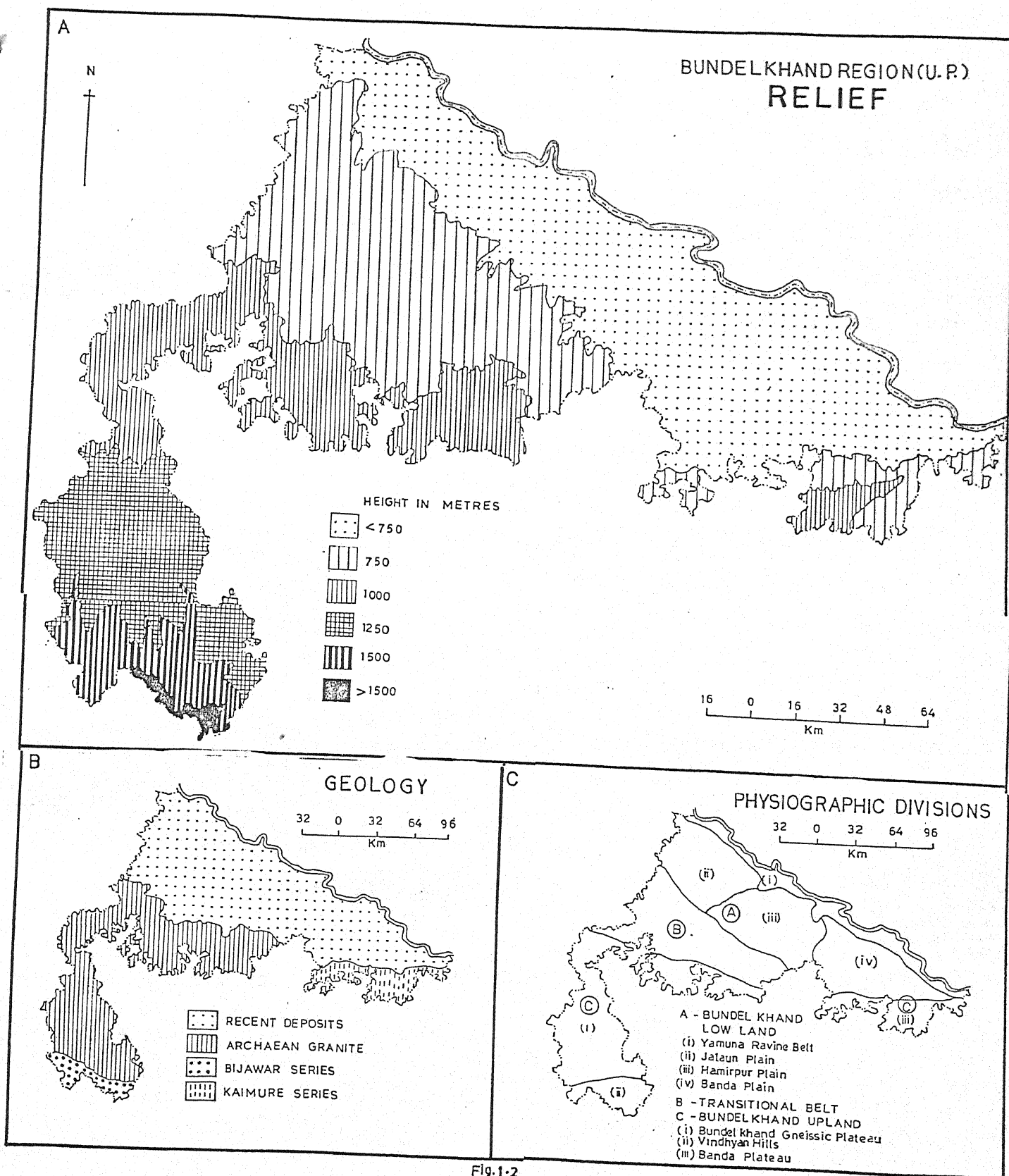


FIG. 1-2

and characteristics of the rocks display an important role in determining the human activities, the social characteristics, type of farming, settlement-patterns and transportational as well as communicational activities. Hard rocky zone of the area has hampered the growth and development of resources and these are not available for human progress. In the boulder and quartz reef areas where the deep and intensive agriculture is impossible, the people are engaged in quarrying, mining and other allied activities.

The geology of Bundelkhand Region (U.P.) (Vide fig. 1.2B) depicts the following four geological systems.

1. THE ARCHAEOAN SYSTEM: Bundelkhand granites and Gneisses.
2. THE TRANSITIONAL SYSTEM : The Bijawar Series.
3. THE VINDHYAN SYSTEM : Kaimure Series.
4. RECENT DEPOSITS : Trans - Yamuna - Alluvial-Plain.

1. THE ARCHAEOAN SYSTEM :

The Archaeoan System of Bundelkhand belongs to the group of oldest rocks of the earth's crust, which is one of the three areal groups of Archaeoan rocks in India.⁶ According to Jhingaran⁷ the Bundelkhand region is 1300 million years old. Saxena⁸ believes in the granitic orography of the Bundelkhand and explains that it was formed in the process of 'replacement' of non-igneous matter crystal by crystal, by hydro-thermal effects and not by magmatic replacement and called them 'black-xenoliths' holds a complete sequence of granitisation which endures his views. Jhingaran⁹, however, remarks that it is easy to solve this enigma, if we accept the granites of Bundelkhand as having been formed in both the manners.

A Geological survey of Betwa and Ken river basins¹⁰ reveals the texture and composition of particles of granites which differ from other varieties. Pink feldsparic coarse grained varieties are dominant but grey varieties are also seen in the basins.

Although the granites and gneisses are utilized in multiple purposes according to

desired needs anywhere, but the main use of these is made in paving roads and completing the railways. Because, in the absence of these stone-pieces (Gitti) roads and rail routes can not be constructed.

2. TRANSITIONAL SYSTEM :

The transitional system named as the 'Bijawar System', was formed between Aravalli and Vindhyan periods and is lying in the Bijawar tahsil of Chhatarpur district. This sediment exists on the granites and under the lower Vindhyan beds.

Although, the thickness of Bijawar System no where is 70 to 216 metres, yet the percentage of iron-ore is high, and, therefore, from very beginning was exploited by Bundela Chiefs¹¹. Bundelas used it during times of war, in making the war-carriages or weapons.

3. THE VINDHYAN SYSTEM :

In Algonkian age, about 600 to 700 million years ago, there was an ancient geosyncline, called the 'Vindhyan sea'¹², which was filled with the deposits of ancient Aravalli ranges. The present evidence of fluviomarine deposits indicates the remoteness of geological time.

The two powerful forces had reacted in the formation of this system - one tectonic movement came from west and second isostatic adjustment from South¹³.

The Kaimur series is not a aloof part of Vindhyan system and is constituted by 'relict structure' due to the sculpturing of a basin of sedimentary rocks in whcih a series of hard sandstones has played an important part¹⁴.

The region is surrounded by this series (Kaimur) except in the north. It covers a little Southern portion of Lalitpur plateau and middle part of Bijawar series.

The importance of this system or series is obvious. Because the gems and the Vindhyan Sand stones have been used in the construction of historic monuments¹⁵. Historical places attract the people and contribute a lion's share in regional economy. Tourism and transportational facilities have good prospects.

4. THE RECENT DEPOSITS :

The northern sector of the region, which was a 'Geosyncline' of the Vindhyan sea is filled up with the sediments carried by the northern and southern streams. The thickness

of the deposits in north is deeper than in the southern part of the region. Undoubtedly, the Trans-Yamuna alluvial plain is very fertile which is considered as a predominantly agricultural part of the region.

C. SURFACE CONFIGURATION :

GENERAL SHAPE :

The topography of the region is rude and undulating in character what Spate has remarked as 'Senile Topography'¹⁶. It passes through the recent alluvium and low lands in the north (66%) on the one hand and Vindhyan upland in the south on the other (29 percent upland and 5 percent of hilly area).

U.P. Bundelkhand is very often divided into two physiographic units - the upland and, the lowland. This classification is rather convenient and apparent. But, a detailed study of U.P. Bundelkhand discloses as many as three physiographic units which are categorized in fig. 1.2C.

- (1) The Bundelkhand upland
- (2) The Transitional Belt, and

- (3) The Bundelkhand Low Land or the Alluvial Plains.

(1) THE BUNDELKHAND UPLAND :.

It covers most of the Southern part of Hamirpur, Banda and the whole of the Jhansi district. It can be further sub-divided into two sub-divisions as Vindhyan hill ranges and Banda (Chitrakut) Plateau running from east to west. The Vindhyan hill ranges start from the Bhalwali village and continues upto Bodha. The local elevation of the ranges does not exceeds 610 metres above the sea level. It is a broad undulating land ranging from 150 - 350 metres. The Vindhyan scarps are the conspicuous features locally known as 'Ghatis'. These ranges are narrow flat topped hills but their breadth increases on Lalitpur plateau by about 32 kms with the average height of 503 metres. In the north, it is marked by numerous isolated hills such as Imalia, Malmal Golakot and Bari Pahar. Wadia, remarked that "they are more prominences left standing while surrounding parts have disappeared in the prolonged denudation which these regions have undergone.¹⁷.

In brief, its sub-divisions are as below : -

- (i) Bundelkhand Gneissic Plateau,
- (ii) Vindhyan Hills, and
- (iii) Banda Plateau.

(1) BUNDELKHAND GNEISSIC PLATEAU :

It spreads over the Jhansi district. The formation consists of massive granite and quartz reefs. Owing to the intermediary position between the plain in the north and upland in the south; the Bundelkhand gneissic area¹⁸ takes both type of characteristics. The basic types of dolerite and isolated groups of granite and half burried hornblende often criss-cross the country. They run in parallel direction from south-west to north-east. All the tributaries and 'nalas' of the Betwa system follow the same rocky slope. The landscape is characterised by large chunks of waste lands and hilly and undulating surface.

This gneissic plateau bars the economy because the red soil, carrying less capacity of cropping and low water-table. This part is well accessible by the roads.

(ii) VINDHYAN HILLS :

These hills stretch over the Mahroni

tahsil and a very little part of the Lalitpur tahsil in Lalitpur district. It is covered with stunted trees and forest consisting mostly of the gneissic rocks and is interspersed with short narrow and low ridges running parallel to drainage in Lalitpur. Its gneissic topography forms a resistance for road network in the region and, therefore, of that tract the economy is less sturdy than the other.

(iii) BANDA PLATEAU :

It spreads over the southern part of Banda district. In this tract poor and backward economy is the main reason of the criminal activities. Its rugged surface, interrupted land and mis-use and exploitation of the rocky parts are responsible for such activities in the region. There are short narrow and low ridges tending to form clusters in Banda plateau.

The highland is clothed with deciduous forests and is rich in fauna. Economically, it is an agricultural and poor region. Only in small shallow patches agriculture is being practised and economy of the people is partly supported by the live-stock and forest products. In the midst of the jungles people are engaged in cutting

timber, in plucking the Tendu leaves and in collecting the minor forest products. Near the hills and hillocks people are busy in quarrying-works. Here, the means of communication and transportation lack and are responsible for the under development of the region.

(2) THE TRANSITIONAL BELT :

It covers the intervening area between the Trans Yamuna Plain in the north and the granitic land in the south. That is demarcated by the 250 and 300 metre contour line in the north and south respectively. Its average elevation is more than 274 metre above the sea level. It consists of the Moth, Garautha, North of Mauranipur and Charkhari and South part of Mahoba and Rath Tahsils. Further East, major portions of Karwi and Mau tahsils come along the belt.

The western part of the tract is more eroded than the eastern part. The local hills are often dotted over the region mainly in Charkhari and Mahoba tahsils. Comparatively, the western part is more fertile because of the transported soils and canal irrigation than the eastern Part.

(3) THE BUNDELKHAND LOW LAND :

The Trans-Yamuna plain is a sub-part of the broad Ganga-Yamuna plain, which can be sub-divided into the following parts : -

- (a) The Yamuna Ravine Belt,
- (b) The Jalaun Plain,
- (c) The Hamirpur Plain, and
- (d) The Banda Plain.

The ravine belt is composed of 'Kankar' and clothed with the thinnest vegetal cover. The area is badly dissected and eroded by enumerable torrents. These high knolls are the result of gully erosion, locally known as 'Jar', 'Bihad', 'Khar' 'Karar', etc. Having the less fertility of the soil and low water-table its agricultural prospects are limited. The means of transport are very poor in this part of region.

The ravines of Pahuj, Sindh, Betwa, Chambal and Yamuna, are still defamed for dacoity problem.

Such dangerous and cancerous activities can be ended if the truly efficient modes of transport and communication are extended in the

region.

The Jalaun plain is considerably important for agricultural activities. The rail and road transportation also contribute a lion's share in its development. The transport facilities display an important role in the economy of the Jalaun plain.

The Hamirpur plain is endowed with black soil on which dry farming is performed. The Rath tract of the plain mostly depends upon Dhasan Canal for its irrigation. Here wheat and gram are the main Rabi crops, grown popularly. The plain is lacking in the sufficient rail and road networks for the future development.

The Banda plain consists of Banda, Baberu and Naraini tahsils. It is one of the dominant agriculture regions of U.P. Bundelkhand. In this tract, rails and roads are main transport-arteries.

In brief, surface configuration or upland-lowland, peneplain, plain and rugged land

cummulatively influence to the type and category of transport-arteries.

D. DRAINAGE :

The perennial streams of the region follow the general slope of the land from south-west to north-east direction and constitute a natural drainage pattern of the region (fig. 1.3A). All the tributaries of the Yamuna river originates from the upper Vindhyan region and follow the slope. Their courses are marked with gorges and cascades when they cross the sand-stone formation¹⁹. Owing to the character of rocks dendritic pattern is developed in the region. Certain points of Play fair's law are reflected in the study of regional drainage. Firstly, the valleys adopt the size of the streams according to their own size. Secondly, the stream junctions are in accordance with the level and thirdly, the valleys are carved by the streams flowing in them due to the rapid run-off.²⁰

WATER-TABLE :

According to nature of the terrain the depth of water-talbe varies from 6 to 25 metres from one place to another. In areas of irrigated

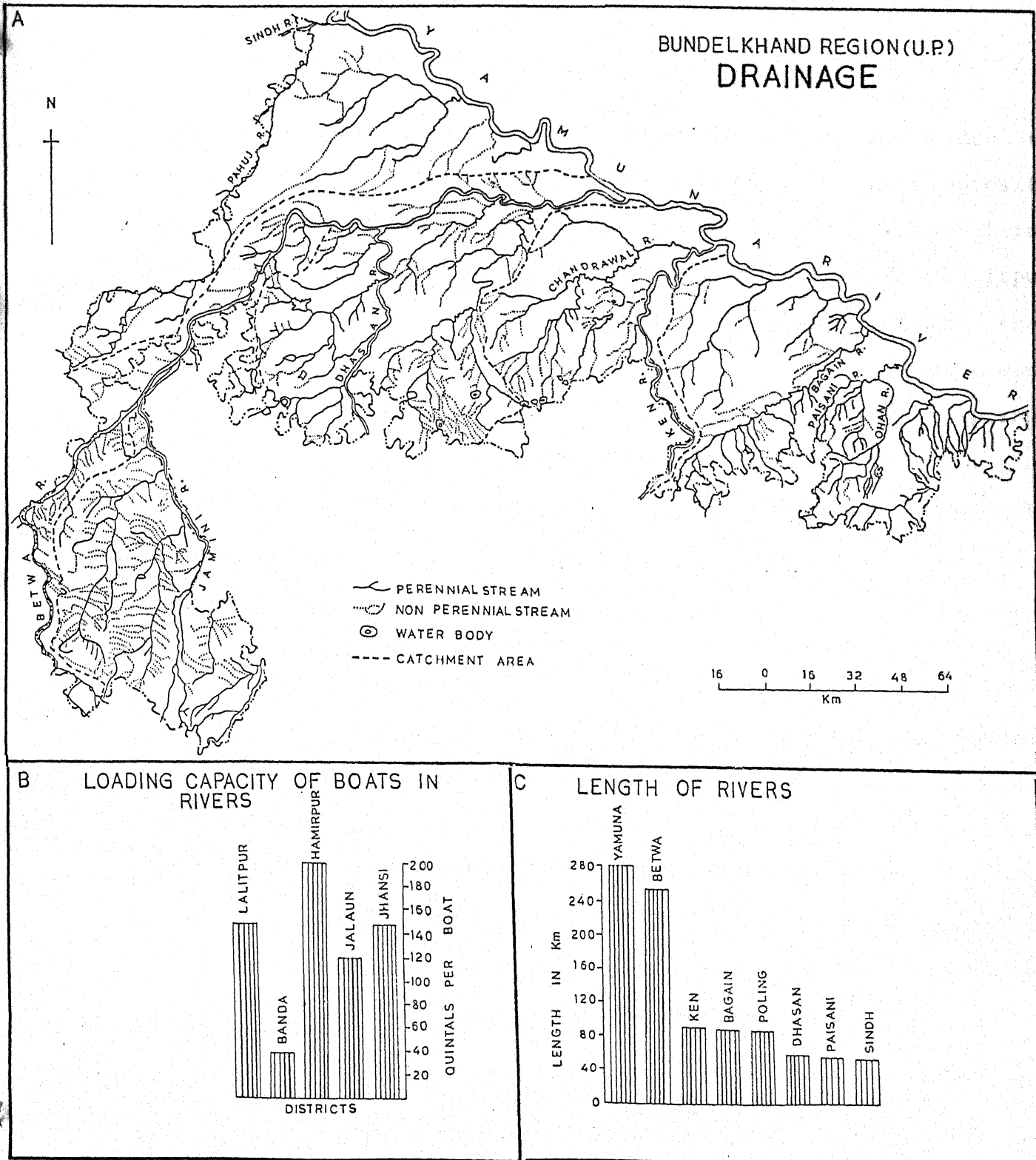


Fig 1.3

land, it is higher than in other parts due to the high percentage of humidity. The less porosity and high percentage of evaporation in the crystalline rocks at Patha area of Banda district and Lalitpur plateau has kept the water table deeper than in plain areas. It has an underground movement of water and creates springs at Lalitpur and Karwi areas in the region which have their own economic and scenic importance.

SURFACE WATER-BODIES ;

The hard topography commands the surface water and does not permit it to sink underground quickly. The tanks, lakes and reservoirs render great service to the socio-economic life of the region. On the Southern upland numerous water-bodies, created by men, are established. The low land is well known from wells and canal nets. The region is much obliged to the Chandelas

dynasty for the several public water-works.

THE RIVER SYSTEM :

The perennial rivers are great sources of surface-water. Fig. 1.3A shows that the region is drained by the Yamuna system of rivers, and the main tributaries of the system are the Betwa, Dhasan, Ken, Sindh and Pahuj. They swell up in the rainy season and quickly subside into narrow deep streams. The number of seasonal torrents criss-cross the land and make the surface rough and undulating. Floods often bring a destruction to the life and property of the region.

The catchment area of the main streams is as followed: -

TABLE 1.2
THE CATCHMENT AREA OF THE MAIN STREAMS

<u>THE YAMUNA SYSTEM</u>		<u>AREA IN SQ.KMS.</u>
(a)	The River Yamuna	9650
(b)	The River Betwa	21222
(c)	The River Ken & Dhasan	14667
(d)	The River Sindh and Pahuj.	<u>9318</u>
		54857

Source: The report of the Zonal Office, Bridge Corporation, Jhansi.

(a) THE YAMUNA:

After flowing about 720 kms from the place of origin the river enters the region near Jagammanpur (Jalaun) where five Vindhyan streams pour their water in it. The Yamuna is the only river which originates from the Yamunotri 13 kms. from Kurseli (Kasoli)²¹. So far its value is conserved, it is insignificant for the region because its right bank stands just like a straight highwall (20 to 60 metres) which do not permit successive penetration. However, it covers an area of 696 Kms. from Agra to Mau (Banda), which has historical²² importance. It is a largest and navigable stream of the region (fig. 1.3 C).

(b) THE BETWA :

It arises from the Vindhyas near Kumri (Bhopal). After flowing 48 kms. in the south, it constitutes the inter-provincial boundary between U.P. and M.P. On the upland of Bundelkhand the Betwa flows through the deep rocky beds. Near Deogarh fort it makes a magnificent gorge and cliffs. It scores innumerable ravines, flowing onward through the beating banks. In some places stream fringes strip off alluvial land between

the river and the cliffs. Mata-Tila, Dukwan and Parichha dams are the beautiful gifts of the same which are the source of Betwa canals. Economically, the Betwa is important among all the regional streams inspite of rocky basements. It occupies largest catchment area of 21,222 kms. in the region. The Dhasan is an important tributary of the Betwa and water is drained to the Dhasan canals.

(c) THE KEN :

The Ken touches the region in Naraini Tahsil of Banda District. In the upper course it flows through the undulating hilly tracts. It is perennial but not navigable due to rocky beds. The Ken becomes a beneficial river to Banda district which supplies sufficient water to the region through the Ken canals. Right Banks are steep and scratched with ravines while the left banks are gentle and marked with alluvial deposits. Extensive alluvial plains which are called 'Tari' and 'Kachhar', lower and upper beds respectively, are highly fertile. In rainy season it causes floods and affects the lives.

The Chandrawal is a large affluent

of the Ken. Other main tributaries are Shiyam, Kel, Bichui and Gawain.

(d) THE SINDH AND PAHUJ :

The eastern slope of the Aravalli range is the source of Sindh. When it marches further Nun, parvati, Chachhond, 'nalas' pour their water, therefore, its volume goes to high. It meets to Yamuna near Jagammanpur.

The Pahuj is another tributary of Yamuna which flows through the undulating course in upper part, but through plains in the lower part. The Pahuj river is a beautiful gift, which commands a large area for irrigation.

In the eastern part the Bagain and the Paisuni are the main streams of Bundelkhand. Mythologically the Paisuni or the Mandakini is a holy river due to Ram's stay on its banks during his exile.

In Brief, all the regional streams have local significance. The Yamuna is only all weather navigable and having great importance in water transport.

(e) CLIMATE :

Climate is one of the dominant factors which affect the development of transport-network as well as regional economy. Due to its location in the sub-tropical belt, the region experiences the monsoon climate. With all its rhythms, vagaries and extremes, it affects every detail of lives. The year may be divided into four successive seasons. These are -

- (i) THE WINTER SEASON (December to mid-March),
- (ii) THE SUMMER SEASON (Mid-March to Mid-June)
- (iii) THE RAINY SEASON (Mid-June to Mid-Sept.) and
- (iv) THE AUTUMN SEASON (Mid September to Mid-Dec).

(i) THE WINTER SEASON :

This season commences after the transition season that comes after the full recession of the South-West monsoon. The winter season occurs from mid-December when temperatures and relative humidity fall considerably. In this cool and bright period it rains occasionally from Western disturbances specially in January and February. January is the coldest month of the year when the average minimum temperature ranges from 8.9°C on the Southern upland to 4.4°C in the

plain near Jalaun. Nights are frequently chilly in late winter and frosts occur when cold wave sweeps the region from the west or north-west. The climatic chart of Jhansi (Fig. 1.4B) shows that the temperature ranges from 10°C to 12°C in January and February. Besides the winter rains though little in quantity, are much beneficial to the Rabi crops. The cold climatic conditions are suitable for the physical and mental activities of the human beings.

(ii) SUMMER SEASON :

From mid-March onwards both day and night temperatures begin to rise progressively and increase in May to 42.6°C . The sun rays become scorching. In this intense heat and driest period the hot and strong winds locally known as 'Loo' blow afternoon overall the region. The nights become cooler than the days particularly in the late hours. This season ends about middle of June. The region specially Banda district records high temperature every year which obstructs local activities.

(iii) THE RAINY SEASON :

This season starts from mid-June when the summer monsoon abruptly bursts, because

15th June is regarded as the normal date²³. During this season the relative humidity generally exceeds 70%. The winds strengthen slightly and are mainly Westerly or South-Westerly and above 90% of the annual rainfall comes in this season. In Jhansi the mean annual humidity is 56% (1984) (Fig. 1.4B). The movement of people and goods are retarded during the rainy season.

(iv) AUTUMN SEASON :

It is a short period between rainy and cold season which occurs from mid September to mid December. The temperature in the month of October remains like September (32.2°C), but after October it decreases rapidly. The average relative humidity is generally between 50% to 65%.

DISTRIBUTION OF RAINFALL

Fig. 1.4A shows that the distribution of annual rainfall is uneven, ranging from less than 80 cms. in the north-west to more than 100 cms. in the east and south-east. The region around Mehroni-Narhat (Lalitpur) in the Southern upland records 112.1 cms. of the maximum annual rainfall, while the north-west

of Jalaun gets only 74.07 cms. The rainfall in the region in general increases from the north-west towards the south east. The critical isohyte of 100 cms. encloses some area of Southern upland. The isohyte of 80 cms. passes through the north-west of Jalaun plain and marks like dry zone.

VARIABILITY OF RAINFALL:

There is high variation in summer and winter rainfall in the region. Fig. 1.4C shows that during winter season the north west part of the region records the rainfall of over 5 cms while the south west and west record below 3 cms. As one passes towards north-west from south-east, variability of rainfall increases. The rainy season continues from mid June to mid September. Fluctuations of monsoon are well experienced in this part of region. Some times it starts prior and ends earlier. The increase in seasonal rainfall and the associated decrease in the variability of the rainfall from west to east are experienced in the both the regional stations as : -

STATIONS	SEASONAL RAINFALL	SEASONAL VARIABILITY
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Jhansi	33.72 Cms.	44.6%
Banda	96.95 Cms.	36.0%

Source: Director, Regional Metereological, Centre, New Delhi.

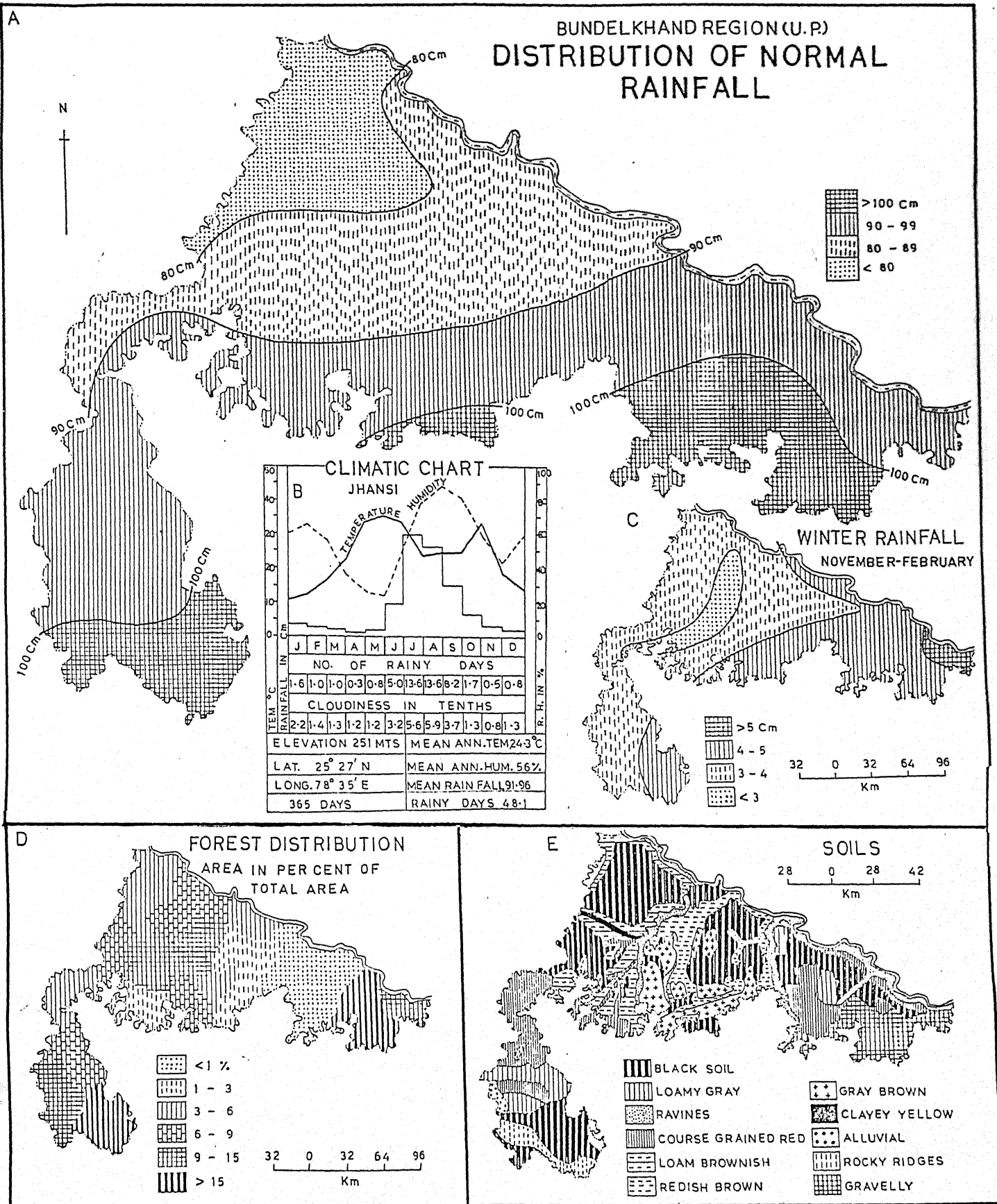


Fig.1.4

The annual variation of rainfall is not acute, but there have been recorded scanty rainfall during last few years. In a year there are 42 rainy days on an average. The regional economy and transportations are adversely affected during rainy season. Heavy rainfall breaches rails and roads and floods agricultural areas. The accessibility of areas decreases.

(f) SOIL :

Soil is one of the most valuable resources. It is the upper layer of rock formations caused by the various factors of denudation.

Broadly speaking the soils of Jhansi Division can be divided into three main groups (Fig. 1.4E) as under : -

- (i) Upland soils (Patha),
- (ii) Lowland soils Sub classified as -
 - (a) Black soils (Mar & Kabar),
 - (b) Red and yellow soils (Rankar),
 - (c) Alluvial soils (Parua).
- (iii) Riverine soils (Tari and Kachhar).

(i) THE UPLAND SOILS :

This type of soil stretches over both the areas of Vindhyan Plateau. These soils are termed as 'Patha' soils in eastern part of Banda district. The gravelly soils cover the Karwi, Mau and east-western part of Naraini tahsil.

In the same manner mountainous soils also, cover the South Lalitpur and Talbehat tahsils. These soils vary in texture and depth according to the gradient of ground. The soil is reddish and brown in colour. The texture is not suitable for agriculture, but it is generally more suitable for pastoral economy.

(ii) THE LOWLAND SOILS :

(a) THE BLACK SOIL :

It is developed mostly over Jalaun, Northern Hamirpur, Banda plains, Southern upland of Mahroni, Lalitpur, Moth and Garautha tahsils of the region. It is regarded as "an immediate product of the decomposition of gneiss²⁴. It bears a resemblance to the black cotton soil of central India²⁵. The sub-classes of this soil are known as 'Kabar' and 'Mar' respectively. The 'Kabar' soil is a coarse grained loam in

texture, mature in profile and dark grey to black in colour which has a high clayey element (20 to 50 per cent), the coarse sand and soluble salt being low, lime being about one per cent throughout and magnesia even less. It is very productive under careful management but even a slight diversion from the agricultural time table renders it unsuitable for cultivation. It is not subject to erosion and the areas where it occurs and is well drained.

Mar soil is clayey in texture, mature in profile and black in colour and 'Kankar' beds are found here and there. The percentage of clay in it is high (varying between 40 and 50 per cent) but that of coarse sand and soluble salts is low as is also the case with lime and magnesia.

(b) RED AND YELLOW SOILS :

This soil covers an area around black soil of Jhansi, Jalaun and Hamirpur districts of the region. According to the texture and colour it is further sub-divided into three groups - loam brownish, redish-brown and grey-brown. The lime content is less than one per cent while magnesia is even less than that of salt.

The areas covered by such soils are much productive. These soils are subject to hazards of erosion. The soil - conservation practices that are useful in affected areas are making the bunds, the farming on terraces and contour tillage. The profile is mature with 'Kankar' beds also at places. The clay content is medium (being between 13 and 45 per cent). Drainage is not a serious problem. The storing of water is useful. Irrigation is a pressing pre-requisite for the successful agricultural development of the areas where this type of soil occurs.

(c) ALLUVIAL SOIL :

The loamy grey, clayey yellow and alluvial soils fall under the same category. Within the reason a strip of alluvial soil exists in the Western part of tahsil Lalitpur adjoining Madhya Pradesh. A tract of insignificant clayey yellow soil occurs in the northern most part of the district Jhansi, forming the boundary between it and the district of Jalaun. The loamy grey soil stretches over the small part of lalitpur and Talbehat tahsils (Lalitpur) North-West Banda and South Baberu tahsils(Banda).

The alluvial soils of the plains have undergone but little pedogenic evolution since their deposition by river agency. They are still largely immature and have not developed any characteristic soil profile, or differentiation into zones²⁶. So the general minor variation in density, colour, texture, porosity and moisture content of its various forms become common. 'Bangar' and 'Khar' are other popular divisions of the alluvial soils. The former lies on the surface while the latter a few feet below the ground.

(iii) THE RIVERINE SOIL :

In general the ravinous or 'Ghar' soil is found in scattered places along the rivers of the region, such as the Yamuna, Betwa, Dhasan, Ken and Pahuji. The tahsils of Kalpi, Hamirpur, Jalaun, Banda and Baberu, represent this soil. The soil requires reclamation and lacking for economically viable cultivation.

The soils of the U.P. Bundelkhand have their direct bearing on the agro-based economy of the region. That is why the quality of soil has affected the density and distribution of population as well as the construction

of rails and roads for the transportation of agricultural products of the region. The areas of hard and thin soils and plains of alluvial soils have provided a fair opportunity for the development of transport- network in the region. The plateau areas have facilitated the road construction due to easier availability of construction materials.

(g) NATURAL VEGETATION

The vegetal cover includes all the trees, plants, bushes and grasses which are naturally grown without any planning. It is the product of physiographic, climatic, edaphic and biotic conditions of the land scape, therefore, it varies according to environmental balance from humid to semi-arid regions. The Trans-Yamuna Tract shares both the dry deciduous as well as thorny forests²⁷.

Banda and Lalitpur districts possess more than 65% of the total forest area in the region. Jhansi, Hamirpur and Jalaun share only 34% of the total forest cover. The plateau areas of Lalitpur, Talbehat, Mehrouni, Mau and Karwi tahsils are densely forested and Banda, Maudaha and

Baberu tahsils are the least forested in the region.

FOREST ASSOCIATION :

On the basis of plant-communities regional forest can be classified into three groups as below : -

(a) TEAK (TECTONA GRANDIS) -

Teak is the most significant tree of dry deciduous forests which grows on the high escarpments of Vindhyan land in the areas from 400 to 500 metres high above sea level. The teak are mainly confined in Lalitpur and Karwi tahsils. It is estimated that there are about 2000 teak-trees in this division. On the priority basis teak plantation is mounting on the region.

(b) MISCELLANEOUS FORESTS :

Mixed deciduous forests occupy the lowlands between teak forests above and ravine areas below which carry diversified plant species. In the eastern part of the region where rainfall is sufficient, the forests are less dry.

Among other miscellaneous trees which grow in the plains are Mahua, Pipal, Dhak,

Mango, Neem, Bargad, Gular, Jamun, Amla, Imli and Kaitha, Mahuwa is useful specie which is found in large quantity in the region. It is used in many ways as timber, firewood, oil and liquor.

(c) SCRUB FORESTS :

The scrubs are found abundantly in semi arid and low waste land along the streams which penetrate into the region. The rugged topography of the ravine areas easily allow the growth of Karonda, Karil, Babul, Reonja Dhak etc.

The important trees of commercial and industrial value are Mahuwa, Babul, Shisam, Teak, Charcoal, Khair and Bamboos which are transported according to the regional demands.

THE ADMINISTRATIVE CLASSIFICATION OF FORESTS

The Jhansi Divison covers 10.1% of the total forested area of U.P. On the basis of administrative set-up the regional forests can be categorised into three main types -

1. RESERVED FORESTS :

Under this it comes 70.98 per cent

and geographical area of the total vegetal cover. These are property of the Government. The percentage of reserved forest is high in Lalitpur (7.69%) and Banda (32.56%) districts and low in Jalaun (13.43%) and Hamirpur (4.0%).

2. PROTECTED FORESTS :

Under this category the trees belong to the government but land is owned by the people. The licence is issued to cut the trees and graze the cattle. Only Jhansi district gets the advantage (.89%) for such forests in the region.

3. UNCLASSIFIED . . OR . . OPEN . . FORESTS :

These forests are occupied by the big land-holders. Economically these are less significant. Jhansi Division is much important for open forests. The percentage is high in Hamirpur, Jalaun, Banda, Lalitpur and Jhansi districts as table reveals : -

TABLE 1.3
ADMINISTRATIVE CLASSIFICATION OF FORESTS (%)

DISTRICT	RESERVED	PROTECTED	UNCLASSIFIED.
Jalaun	13.43	..	86.57
Jhansi & Lalitpur	47.69	0.89	51.42
Hamirpur	4.00	..	36.00
Banda	32.56	..	67.44

Source : Deputy Chief Conservator of Forests,
Planning, U.P.Lucknow.

Banda has the largest total forest area of 77781.00 Hectares in the region. The Lalitpur, Garautha, Rath and Mau tahsils have the 9.15% area under forest while the Banda, Baberu and Naraini below 1% (fig. 1.4D).

In brief, although the region belongs a diversity in distribution and area under forest; but forests provide a high value of timber, tendu leaves, bamboo, grasses and other minor products e.g. herbs, tannery materials, gum, katha, resin, lac, honey and other fruits and flowers such as Mahua, Amla, Bahera, Tendu etc. are utilized

as raw materials in various small cottage industries.

These are exported from the regional forests to the neighbouring areas in a large amount. Naturally these forest-products attract the means of transportation to be developed in those areas for proper and economical exploitation of this valuable resource.

With the above description physical features reprints on the cultural set-up of the region.

CULTURAL SETTING

It comprises a salient study of agriculture, live-stock, industry and population, which most affect the economy of the region. These are as below : -

AGRICULTURE :

Agriculture, the back-bone of economy of Jhansi Division, is the most important sector of its economy. In 1981 this sector employed nearly 78.45% of the working force of Jhansi Division. The region is agriculturally under-developed because of traditional and rudimentary forms of cultivation oriented mainly to the production

of cereals. Some of the causes of its backwardness may be attributed to the unfavourable physical conditions also such as the hilly terrain of the South, poor quality of soils being the mixture of red and black varieties, inadequacy of rainfall and irrigational facilities, the serious problem of soil erosion in the ravine areas of Betwa, Ken and Pahuj rivers, the saline and alkaline soils prevailing here and the water logging which will really become very acute in future*.

After independence the agriculture of the region performed, because some important steps such as irrigational facilities, conservation of soils, utilization of culturable waste and fallow land and mechanism had done respectively.

The salient features of agriculture of the region can be taken into being as below:-

- (a) The regional agriculture is carried out mostly on traditional system.
- (b) Mixed and dry cultivation is generally in practice.
- (c) ----- The double cropped and irrigated area

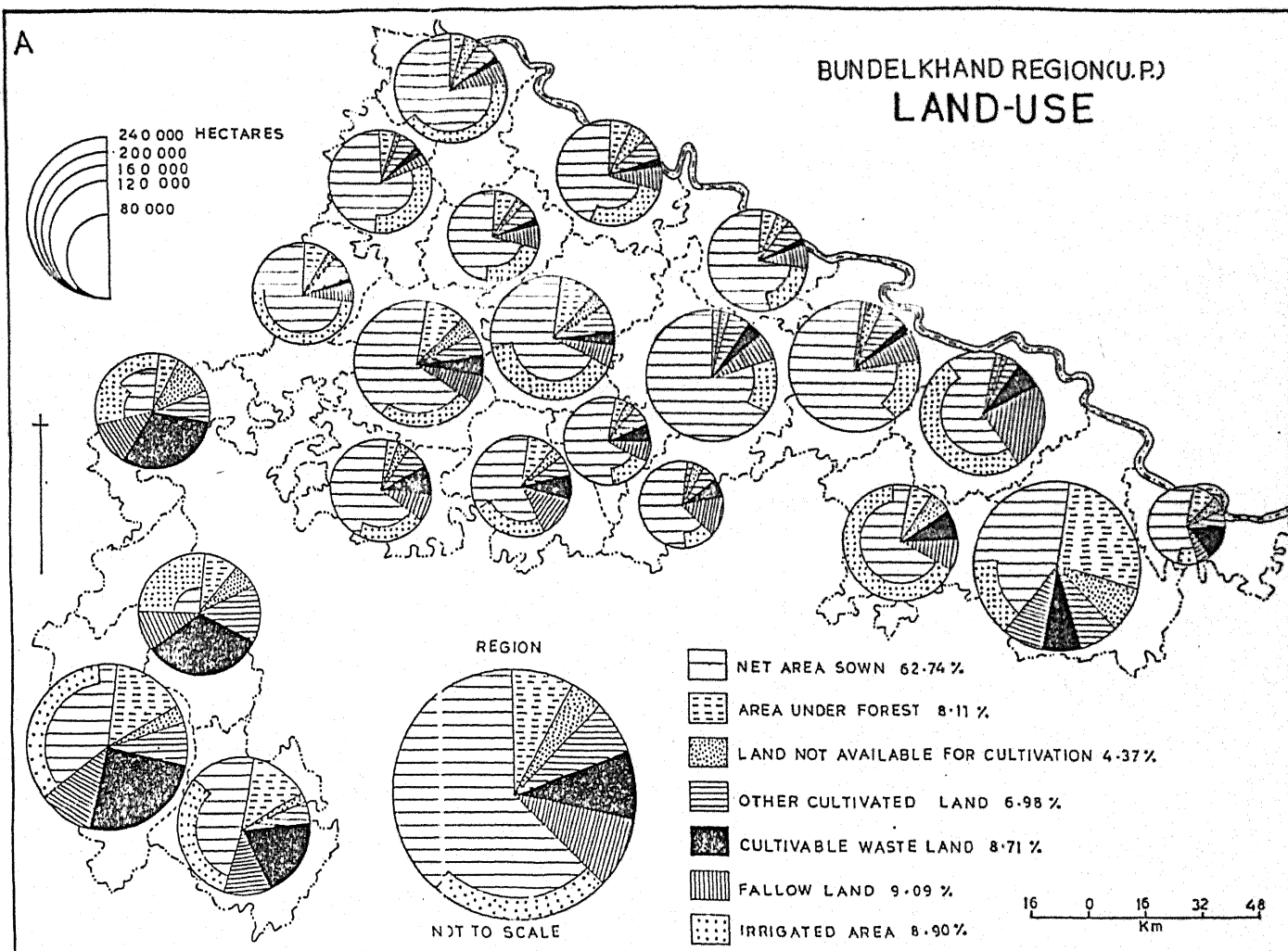
* Techno-Economic Survey of Uttar Pradesh, NCAER, New Delhi, 1965, P.33.

is gradually increasing.

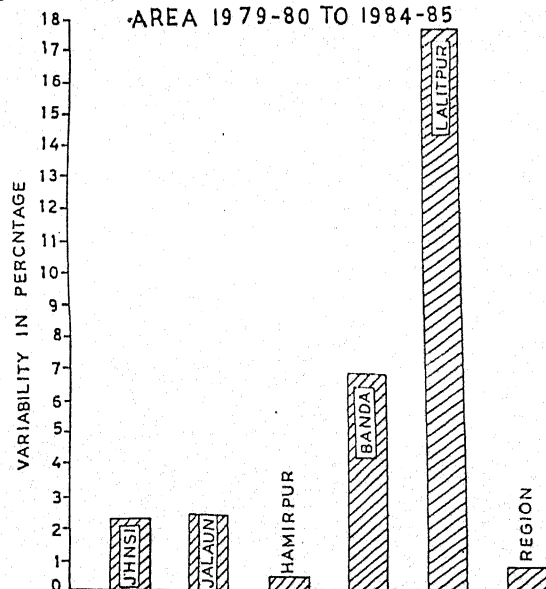
- (d) Industrial crops are insignificant in the agriculture calender.
- (e) Size of holding an important phenomenon of the regional agriculture is small.
- (f) The use of high yielding varieties, chemical fertilizers and mechanization is increasing.
- (g) Bonded labour is still in vogue. Chaituwa labours still migrate from one district to another during the harvesting season.

GENERAL LAND USE PATTERN :

Bundelkhand is mainly depend on the agriculture economy; as its about 70% population depends on agriculture for its livelihood. Fig. 1.5A depicts the land-use pattern of the region. The net sown area ranges from 27.23% in Talbehat tahsil to 81.93%, in Konch followed by Maudaha (80.34%) and Banda (79.32%) Tahsils. Likewise culturable waste land ranges from .86% in Konch to 31.99% in Talbehat. Current fallow land is the maximum in Baberu (24.04%) followed by Mahoba



B COEFFICIENT OF VARIABILITY OF NET CROPPED AREA 1979-80 TO 1984-85



C COEFFICIENT OF VARIABILITY OF DOUBLE CROPPED AREA 1979-80 TO 1984-85

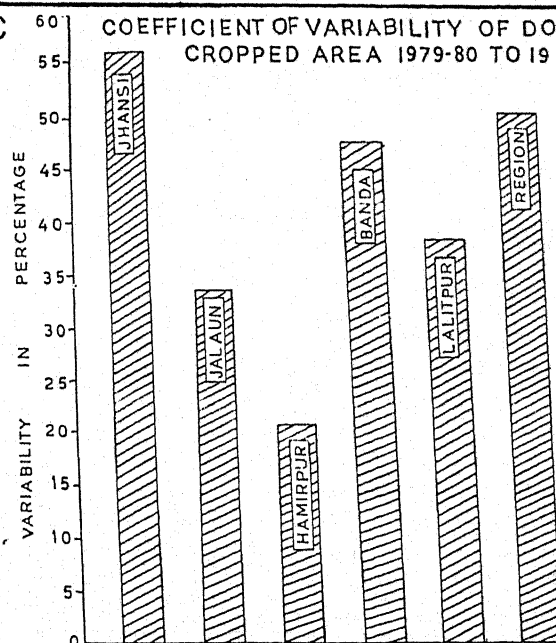


Fig.1-5

(13.89%) and Kulpahar (12.66%). So far as land not available for cultivation is concerned Jhansi stands first (11.79%) followed by Karwi (9.11%) and Naraini (6.72%) tahsils. Only 0.21% of Baberu and 0.65% of Naraini are covered with forests while Karwi and Mehroni tahsils have 26.28% and 15.27% of their areas under forests respectively.

The coefficient of variability of net cropped area is high in Lalitpur (17.7%) and low in Hamirpur (.4%) Fig. 1.5B).

The region as a whole covers 62.74% under net area sown, 9.09% under current fallow land, 8.71% under cultivable waste land, 4.37% under land not available for cultivation and 8.11% under forest of its area (fig. 1.5A).

CROPPING PATTERN :

Fig. 1.5A exhibits that Baberu and Naraini have the highest double cropped area of 38.15% and 34.39% in the east, while Orai and Mahoba have 1.5% and 1.79% in the west respectively. It is mainly because of the irrigational facilities provided in those areas. These areas have more than 42.13% of their cultivated land under irrigation. The coefficient of variability

of double cropped area is 20.53% in Hamirpur and 56% in district Jhansi (Fig. 1.5C).

MAIN CROPS :

There are three seasonal crops in the region. They are called as Kharif, Rabi and Zaid. The main crops of the region are wheat, paddy, gram, millets, barley, pulses (Arhar, Moong, Mansoor, Urd, Mooth). Oilseeds, tobacco, fruits and vegetables. Pulses and oilseeds are generally produced as mixed crops. About 96% of the cultivated land is devoted to food-crops and the rest to non-food crops.

The wheat, gram, pulses and millets are more important crops of the region. Fig. 1.6A shows that wheat is produced in Jhansi (42.88%) of net sown, Lalitpur (41.08%) and Naraini (36.53%), gram in Maudaha (29.51%), Garautha (29.12%) and Hamirpur (28.88%), Pulses in Konch (49.43%), Orai (41.35%) and Kalpi (38.24%), Millets in Talbehat (22.01%), Mau-ranipur (21.25%) and Mehroni (20.91%) and oil-seeds in Charkhari (6.33%) Mehroni (6.02%) and Orai 5.88%).

The intensity of crops ranges from 105.43% in district Hamirpur to over 127.39%

BUNDELKHAND REGION (U.P.) MAIN CROPS (AREA UNDER PRINCIPAL CROPS) 1984-85

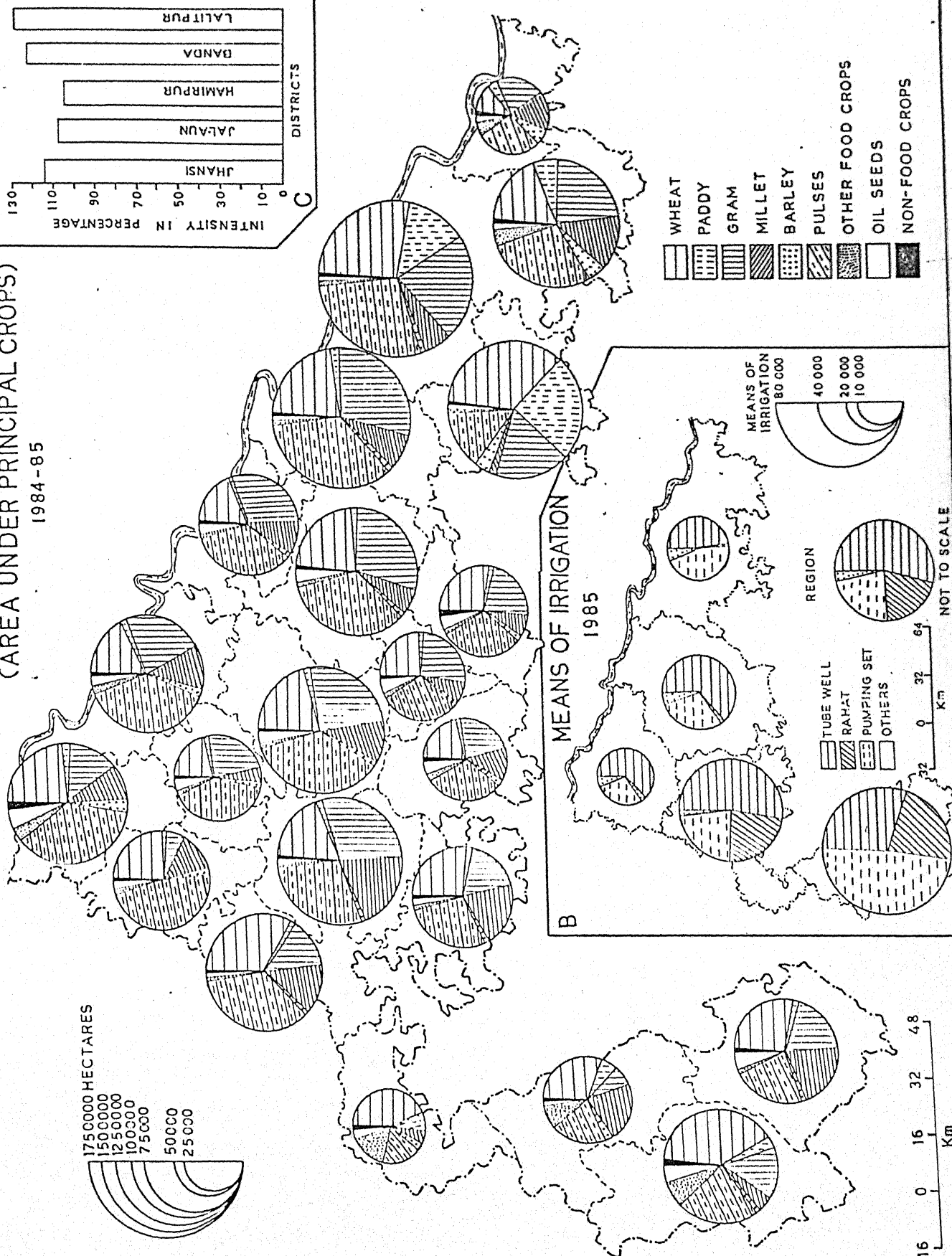
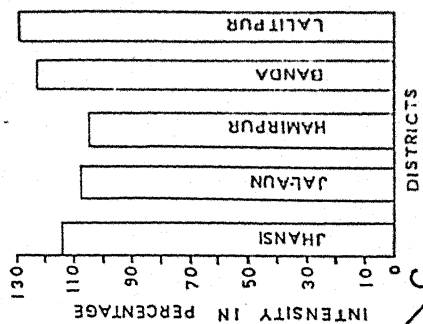
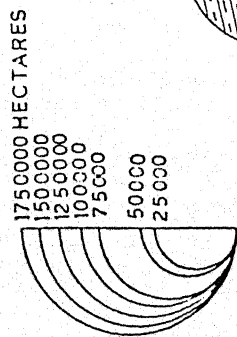


Fig. 1-6

and in Lalitpur (fig. 1.6C). This is mainly because of facility of irrigation. In Jhansi Division a composite system of irrigation has been adopted, because no single system can serve the objective. Government canals, private canals, tube wells, ordinary wells, reservoirs, lakes, tanks, etc., are the main source of irrigation (fig. 1.6B). The total irrigated area with this composite system in 1984-85 was 389084 Hectares (21.25%) in the net cropped area, while it was 8.90% to the total geographical area. Jalaun district had 19.77% of its total area under irrigation, followed by Jhansi district 18.10% Banda, Lalitpur, and Hamirpur districts had 17.01%, 15.80% and 12.81% irrigated areas respectively. In the region Hamirpur and Jalaun are popular in tube-well irrigation while Jhansi and Lalitpur in 'Rahat' and pumping-sets.

THE LIVE-STOCK :

Being the back-bone of regional economy, livestock contributes a lion's share in agricultural and transportational development. Now 70% agriculture depends on animals in rural areas. Fig. 1.7A shows that cattle are more than the other animals and co-operate to the agricultural economy of the region.

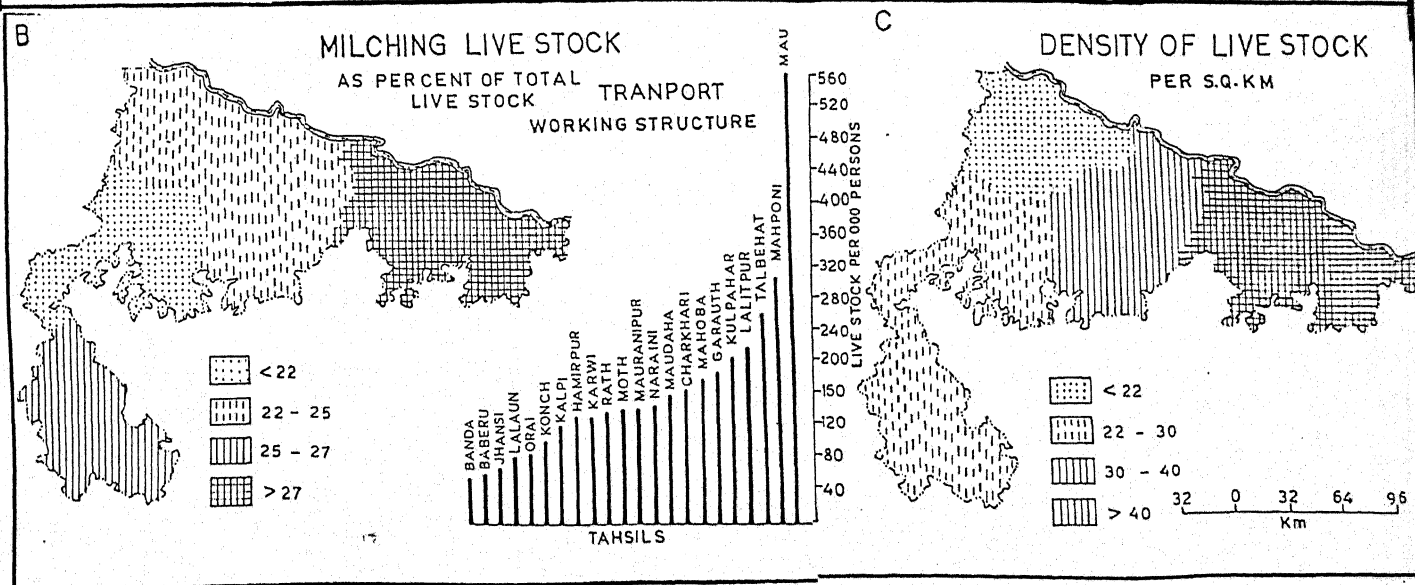
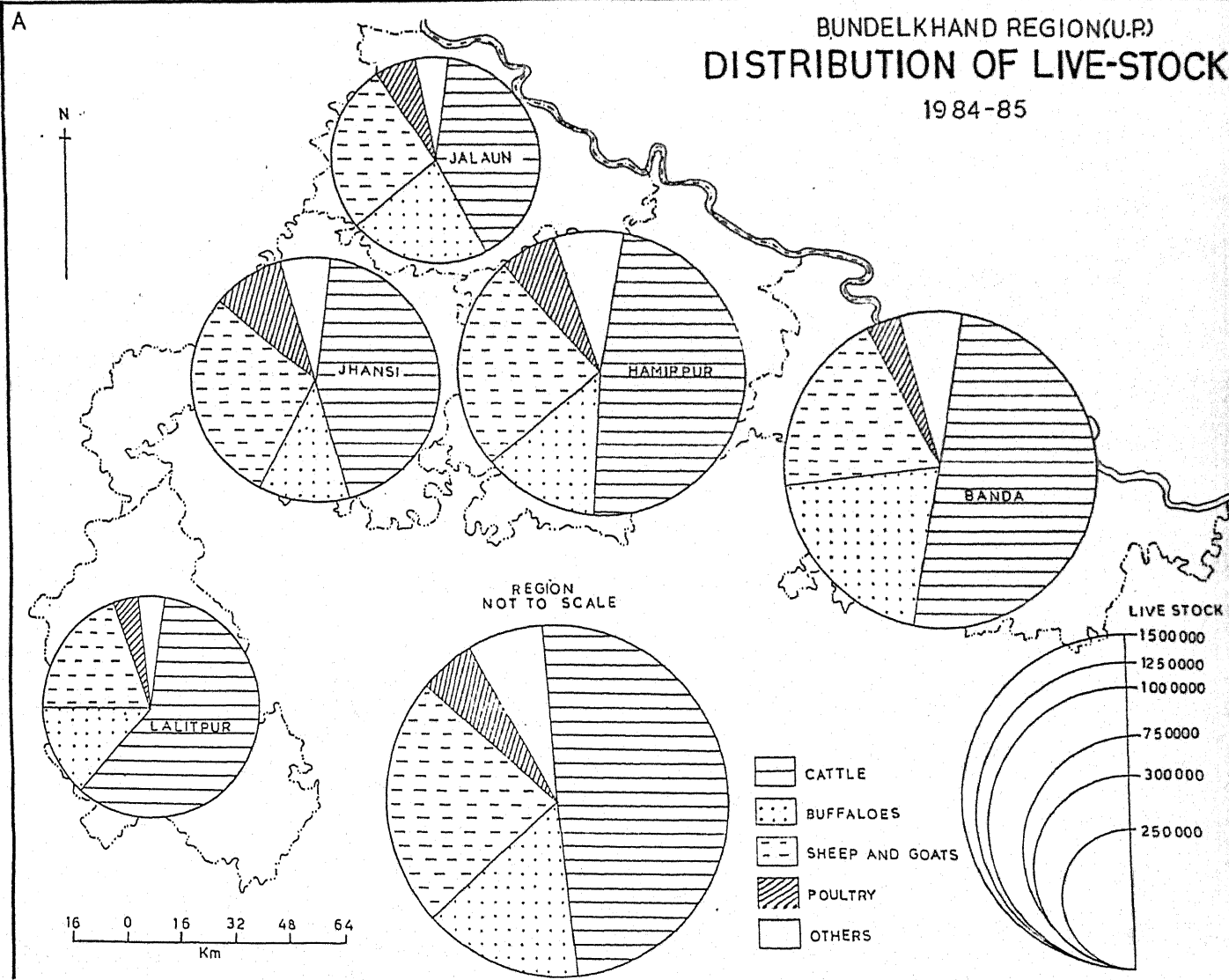


Fig.1.7

The highest density of 45 live-stock per sq. km. is found in district Banda, while lowest in Jalaun (20 live-stock) (Fig. 1.7C). The milching structure of 27 live-stock as per cent of total live stock is also high in Banda than the other districts (Fig. 1.7B). The transport structure of life-stock per 1000 persons shows the highest number in Mau tahsil (560 live-stock) while Banda tahsil represents the least number (58 live-stock).

ANIMAL PRODUCTS :

The animal products are the supplementary source of regional economy. Hides and skins, milk, bones, wool and bristles are main animal products. It is estimated that about 549 lakh pieces of hides and 5.72 lakh pieces of skins are available annually. For the supply of hides and skins Jalaun district comes first 1.59 lakh), (1.65 lakh) and Jhansi district produces 1.46 lakh and 0.52 lakh hides and skins respectively. Banda and Hamirpur districts comparatively supply low quantity.

INDUSTRY

The Bundelkhand is industrially, a

backward region; although it has surplus agricultural products as well as rich in raw materials. It is mainly owing to lack of the government encouragement, the investment of capital and enterprise on the one hand and raw materials and mineral wealth, know-how and paucity of skilled labour on the other. Both the increasing population and limited mineral wealth does not allow the establishment of large scale and heavy industries. Therefore, the problem of employment goes up high. Only small scale and cottage industries appear to be the main industrial sector, which can give employment to the thousands of persons.

INDUSTRIAL DEVELOPMENT AT A GLANCE

The early history of Jhansi Division is very much obscure due to the lack of authentic sources. In the beginning of the eighteenth century, the region was well known for the excellent cloth made by hand. During mid-19th century, in about 1844, Colonel Sleeman noticed that fine woolen carpets were produced in the Jhansi region. In 1909 brassware were manufactured at Mau in Jhansi district and axe heads and coarse blankets were made in Talbehat in Lalitpur district.

Jalaun district had four cotton ginning factories, two of which were located at Kalpi and worked there for a considerable period of time. In 1901, a large cotton ginning mill was established by Messers Baijnath Juggilal of Kanpur at Ait in tahsil Orai. In Hamirpur district coarse cloth was made by some Mohemmadan weavers mainly of Mahoba. In Banda town in around 1909 cooking utensils of copper and bell metal and various articles of gold and silver for household or ornamental purposes were manufactured. In Karwi sub-division there were a number of stone-quarries.

In this region railways were introduced in 1883 and a construction of rail tracts were completed by 1989. It encouraged people for employment. During the pre-independence period and past independence period, an industrial growth was stagnant. But the first industrial policy resolution, 1948, 1956, 1977 and five year plans approved the devleopment of cottage and small scale industries for the advancement of the national economy.

CLASSIFICATION OF INDUSTRY :

The industry of the region can be

divided into three main groups; large scale small, scale and cottage industries.

(1) LARGE SCALE INDUSTRIES :

Under this category the region has two important concerns, the Central Railway Mechanical Carriage and Wagon Work Shop, Jhansi and the Central Railway Transportation carriage and Wagon Workshop, Jhansi. But there are 43 industries which are registered under Factory Act 1948. The Baidyanath Ayurveda Bhavan (Private) Ltd. (Jhansi), Bharat Heavy Electrical Ltd. (Khalar-Jhansi), Aluminium (Jhansi), hand made paper (Kalpi), Mini-Sugar (Jalaun district,) Hume-pipe (Karari) are the main industries, which clustered in western and mid eastern as well as north part of the region. These industries use power and give employment to the people.

DISTRIBUTIONAL PATTERN :

The quantitative distributional pattern of industries varies in the region. The highly concentrated industries lie around few big centres like Jhansi, Mauranipur, Lalitpur, Jalaun and Banda etc. The following table gives the distribution of Industries on district level : -

TABLE - 1.4DISTRIBUTION OF INDUSTRIES IN BUNDELKHAND REGION 1985

<u>SL.NO.</u>	<u>DISTRICT.</u>	<u>NO. OF INDUSTRIES</u>
1.	Jhansi	32
2.	Jalaun	04
3.	Hamirpur	01
4.	Banda	04
5.	Lalitpur	02

REGION:

43

Source: Office of the Joint Director of Industries,
Jhansi Division, Jhansi.

From the above table it is obvious that Jhansi district possesses more than 74% of the industries of the region. So far as their nature is concerned of the 43 Industries 11 belong to general and engineering rolling milling stone granite and emery stone crushing and polishing involves 08 followed by rice-mills, 24. There are 03 printing industries while Ayurvedic medicine industries account for 02. In addition, there are 2 hand-made paper industries, 2 ice industries, two

hume-pipe industries, one cotton textiles, one bone crushingmill, one mini Sugar-mill, one cycle-tube, one mineral based industry and the 03 others. These industries give an employment for 18449 persons. Engineering industry develeoped in Western part of region more than at Khailar and Jhansi. Stone granites milling industries are established at Erich and Jhansi. Among other industries, Vaidyanath Ayurved Bhavan (Private), Ltd., is the main industrial Unit established in 1948 in Jhansi. In this industry care is taken to see that the principles and methods enjoined by the science of 'Ayurved' are followed. The hand-made paper industry well developed at Kalpi (Jalaun) having ample raw material from its surroundings and in north and south. Rice mills have developed at Atarra (Banda) due to easy availability of paddy. For industrial purpose, there is a thermal powr station was opened at Jhansi ; for self sufficiency in electric power in 1913 which co-operates to the industrial functioning.

(ii) SMALL SCALE INDUSTRY :

The small scale industries include food - product and beverages, leather, rubber, chemical, wood and wood product, textile and textile product,

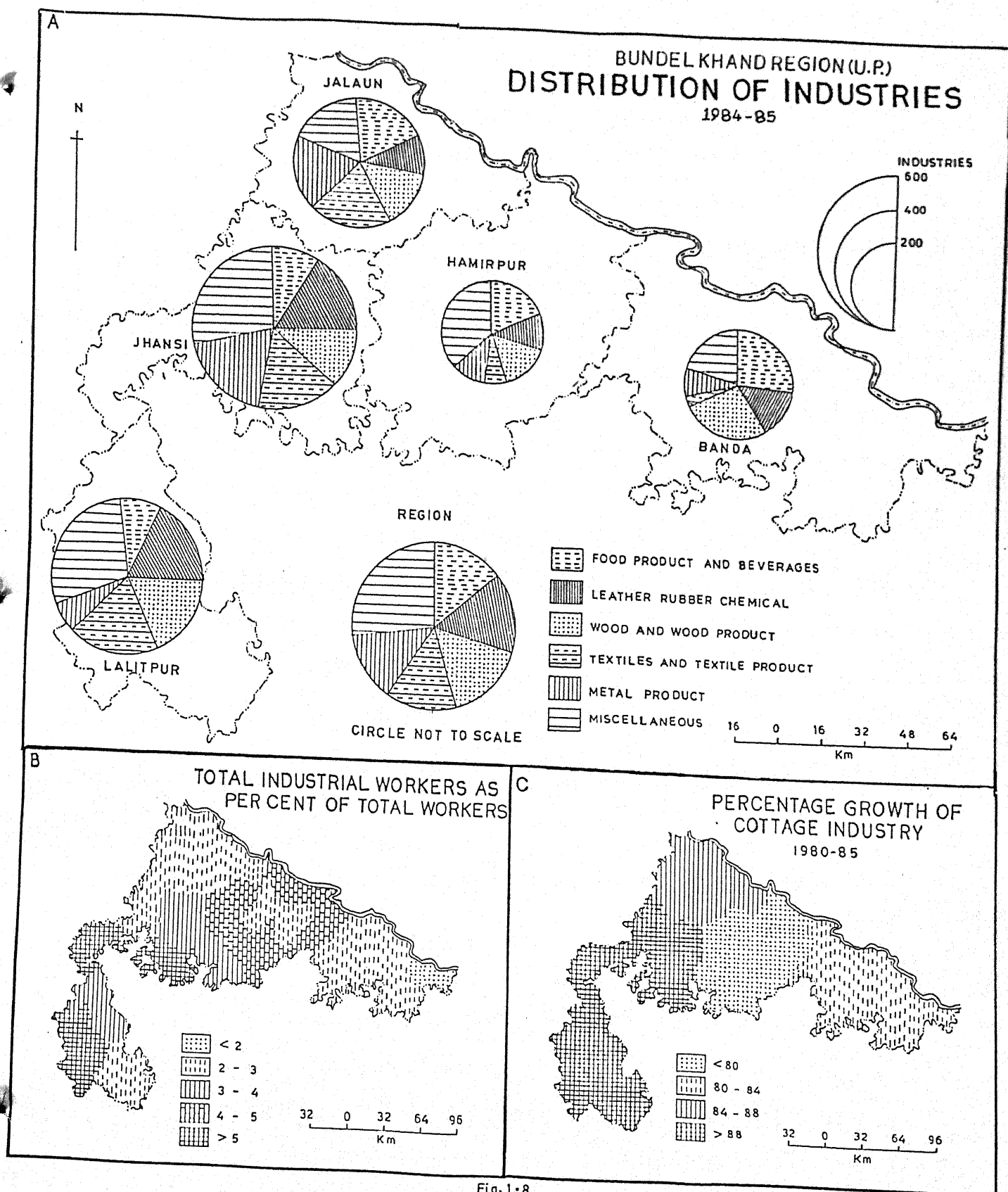


Fig.1-8

metal product, transport product, paper printing, electric/machinery parts and miscellaneous etc., which can be manufactured in small-workshop and may run with small capital of more than 10 lakh rupees. These industries are scattered in varying proportion in the region and their establishment has been primarily requires the availability of raw-materials and skilled labour. Amongst them wood or forest-based industries are widely scattered through out region (Fig. 1.8A), their number is very high in Lalitpur (114 units), while it is less in Hamirpur (43 units) district. After wood industry the textile and agro-based or food-product industries come in succession. In food product Banda district accounts for the largest number of 93 units than the others, while Lalitpur in textile (114 units) stands first in the region.

COTTAGE INDUSTRIES :

These are house-hold industries and widely distributed in the region. They are situated near the dwelling of the workers. These are generally manned by the members of the owners 'families'²⁸. Some industries are specialized at important places such as hand-loom cloth at Mauranipur and Ranipur (Jhansi), Bidi-making at Manikpur

(Banda), wood-toys at Chitrakut and leather working at Kabrai and Sumerpur. Cottage industries have won a traditional fame for their artistic and well designed products. There were about 14000 persons engaged in cottage Industries. The growth of cottage industries happened in Jhansi and Lalitpur more and in Hamirpur low (fig. 1.8C). On the account of industrial working structure, Lalitpur, Jhansi, Mauranipur tahsils have above 5 per cent industrial workers to the total workers, while Mau, Banda, Maudaha, Jalaun and Mahroni have 2-3 percent (fig. 1.8B).

Although some registancive factors such as more efficient organisation of large and small scale industries, cheapness of machine made goods, lack of patronage and assistance and orientation of public demands towards the standardized goods etc., have been responsible for the decay of many cottage industries, yet they are so deep rooted in the economic fabric of the region that many of them have established to maintain themselves, while some are steadily improving. In brief, these industries are regarded as back-bone of rural people and play an important role in rural development.

POPULATION

POPULATION DISTRIBUTION :

Among all the geographical elements three main e.g. transport, population and settlements co-efficiently intertixed and blended features, have the core-power of all geographical sciences. But population or a man as a producer and consumer of goods is a very important factor of any economic process. Trewartha remarks "Man being the creator of cultural landscape carved out on the natural resource formost, naturally takes the supreme position of the apex of the trial of the elemental grouping of the science of Geography while two base points are occupied by the physical and cultural geography"²⁹. The region is no more densely peopled, having of more than 184 persons per square kilometre on an average and with very little urbanism of 19.89%. It presents a very serious population-problem, particularly placing it against almost purely agricultural economy or its age-old fashion. Fig 1.9 A shows the general distribution and urban agglomeration of population in 1981. It does not clear purely an intensity of population distribution except Jalaun and Banda plains, but it opens that Jhansi and Orai are highly urbanised. In 1991, the total

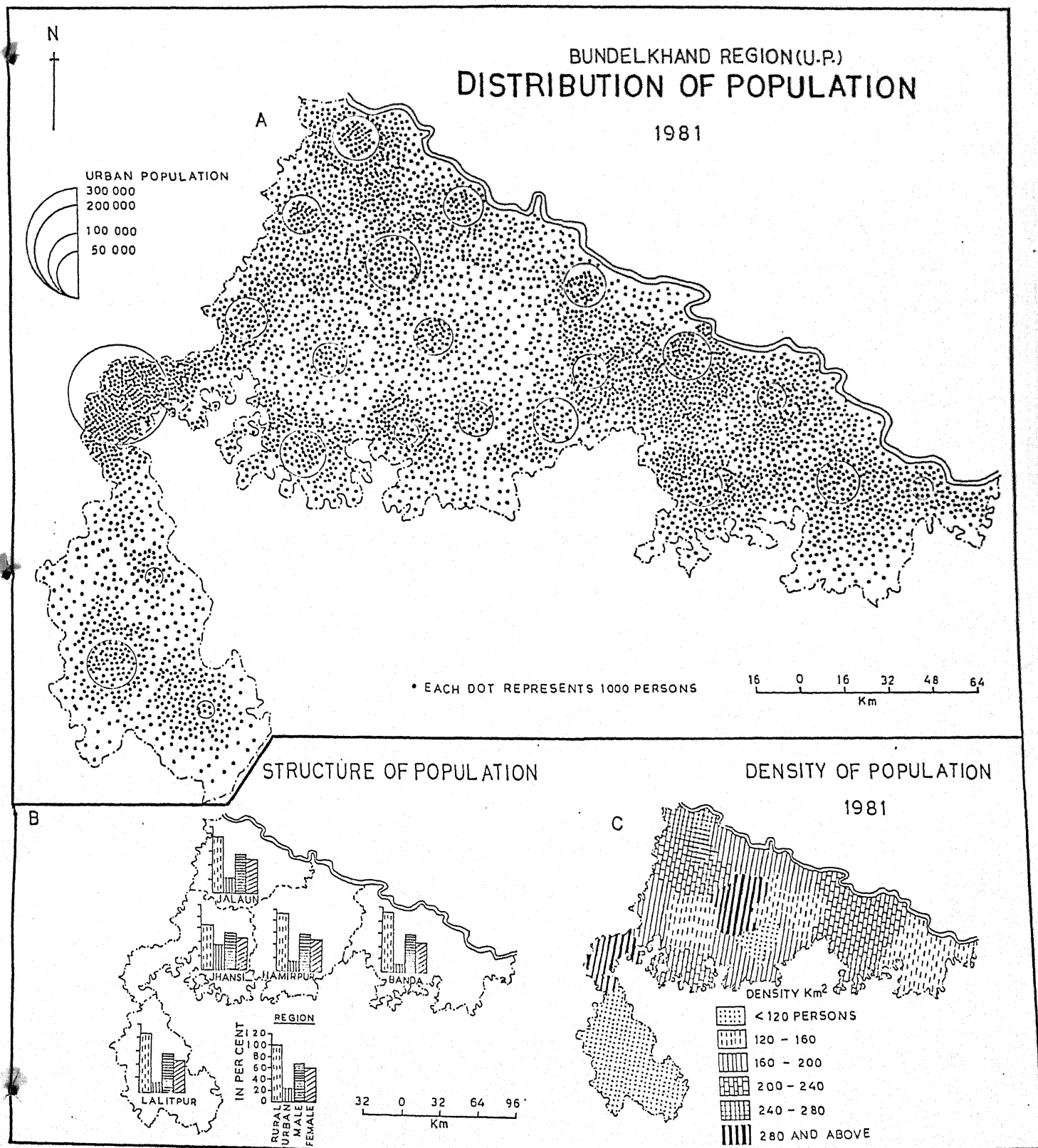


Fig. 1-9

population of the region was 6,709 184.

DENSITY OF POPULATION :

The concept of density of population or the relationship between the people and the land which is generally calculated direct arithmetically, represents the real pressure of population upon the resource-base. In drawing of such a map a considerable degree of subjective judgement and informed interpretation are taken carefully. This is characterised in various parts of the region.

The region can be divided into six categories on the basis of population density as under (Fig. 1.9C).

- (i) Areas of lowest density (below 120 persons/Km²).
- (ii) Areas of low density (120-160 persons/Km²)
- (iii) Areas of Moderate Density (160-200 persons/Km²).
- (iv) Areas of Moderately High Density (200-240 persons/Km²).
- (v) Areas of High Density (240-280 persons/Km²) and

- (vi) Areas of Very High Density (over 280 persons/Km²).

- (i) AREAS OF LOWEST DENSITY (BELOW 120 PERSONS /Km² .:

The district Lalitpur and tahsil Charkhari (Hamirpur) in general carry the lowest density of population in the region. The forested and hilly land is accounted for such sparsely population-distribution.

- (ii) AREAS OF LOW DENSITY (120-160 PERSONS/KM²):

It covers an area of Karwi, Mau (Banda), Maudaha (Hamirpur) and Garautha (Jhansi) tahsils and ranges with low population density in the north and comparatively higher population density towards the South.

- (iii) AREAS OF MODERATE DENSITY (160-200 PERSONS/KM²):

This category is interspersed on Kalpi (Jalaun), Moth (Jhansi) and Hamirpur in the north, Mahoba and Kulpahar (Hamirpur) tahsils in the south. The occurrence of this density is attributed to the distribution of land fertile and plained

in the north and burren Vindhyan Table land in the South where more less area is under cultivation.

(iv) AREAS OF MODERATELY HIGH DENSITY (200-240 PERSONS/KM²):

The land of Banda, Baberu and Naraini tahsils, in the east and Konch, Orai and Mauranipur in the north-west falls in this group. This category covers comparatively greater areas than any other single category because of fertile soil and developed agricultural economy.

(v) AREAS OF HIGH DENSITY (240-280 PERSONS/KM².):

It covers the area of Jalaun tahsil in the north of Jalaun plain, skirted along the river Yamuna. Owing to certain inherent qualities of the area, well irrigated extensive fertile land, developed means of transportation and various other physical and cultural features, the density is high.

(vi) AREAS OF VERY HIGH DENSITY (OVER 280 PERSONS/KM²):

Jhansi and Rath tahsils fall under this

category of density. These are greatest patches of highest density, being having their better developed agricultural, industrial, commercial and transport sectors.

TRENDS OF POPULATION GROWTH

Before the advent of Aryans, the region was populated by tribes like Kols, Bhils and Gonds³⁰. Though it can not be easily estimated about the exact period of Aryans when they came to this region, but is believed that they migrated to this part of country in later Vedic period. During Chandel's regime, the region witnessed peace and prosperity. But in later periods it was mostly disturbed. Passage of time and during the British period it's population increased rapidly, due to the improvements in various facilities. Some important natural and cultural factors like rugged terrain, unfavourable seasons, infertile soils, diseases, transportation, economic conditions etc., are responsible for the growth and distribution of population in the region.

NET INCREASE IN POPULATION FROM 1901 to 1981

In 1901, the total population of the

region was 21,06,085 which increased to 54,38,187 in 1981, showing a rise of 158.21%. The net increase of population was highest in Jhansi (207.68%), followed by Hamirpur (160.41%) Jalaun (147.02%), Banda (143.45%) and Lalitpur (136.34%) districts.

Table 1.5 regards that the growth-trend, after an initial decline in the first two decades (1901-1921). Further it showed a jump population during the next two decades (1921-41). But during the succeeding two decades (1941-1951) a trend of decline was marked again, mainly because of natural diseases and famines. In the previous decade (1961-1971), the trend of growth again indicated a rapid rise. Between 1971-1981, the percentage increase was lowest (20.84%) in Hamirpur and highest (34.4%) in Lalitpur districts, while the average for the State is 25.49%.

TABLE - 1.5

GROWTH OF POPULATION OF JHANSI REGION FROM 1901-1981
DECENNIAL GROWTH IN % WITHIN

Sl. DISTRICT No.	1901- 11	1911- 21	1921- 31	1931- 41	1941- 51	1951- 61	1961- 71	1971- 81
1. Jhansi	8.31	- 6.20	11.67	25.31	6.42	27.85	12.30	30.20
2. Jalaun	1.26	- 0.16	5.07	21.34	7.37	19.48	22.66	21.40
3. Hamirpur	1.45	- 5.30	14.18	28.92	2.66	19.39	24.38	20.84
4. Banda	4.14	- 6.71	2.06	18.28	6.75	20.68	23.96	29.96
5. Lalitpur	13.41	-17.54	17.32	12.76	2.17	18.72	17.13	34.40
REGION:	4.83	- 6.45	8.69	21.88	5.32	31.32	20.71	26.73

Source: District Census Hand Book (U.P.) 1981.

The structure of population also effects the working strength of economy of the region. Only 20% population of the region is urbanised. The highest per cent of urban population (37.96%) is in district Jhansi, having 53.54% of males to the total population (fig. 1.9B). Banda district can be accounted as a low urbanised and 53.63% males live to the total population.

LITERACY :

Literacy of population is one of the most important factors in the overall development

of a region. Jhansi division being a backward region has a very low percentage of literate-population. In 1981 the highest percentage of literacy is in Jhansi tahsil (43.95%) following by Orai (42.49%), Konch (37.45%) and Jalaun (36.12%) tahsils. The lowest percentage of literacy is found in Talbehat (17.80%) followed by Mehroni (17.87%), Baberu (20.04%) and Mau (20.34%) tahsils.

WORKING STRUCTURE OF POPULATION :

Fig. 1.10 A gives a matter of different type of working population in various sectors of the region. Inset Fig. 1.10B shows that the percentage of transport-workers to total workers of population is high in Jhansi (60.29%), followed by Orai (30.62%) and low in Kulpahar, followed by Baberu, Naraini and Mehroni (below 10%) tahsils. It means that of such areas, having low percentage of transport workers the development is handicapped. Fig. 1.10B pictures that the percentage of non-workers ranges in Jalaun and Jhansi (above 70%) tahsils and low in Kalpi (below 50%). The category of 50-60 per cent existed in Mau and Lalitpur tahsils. The percentage of working force depends upon the sufficiency of resources, favourable climatic conditions and other facilities. Non-workers ban the regional development. Both inset

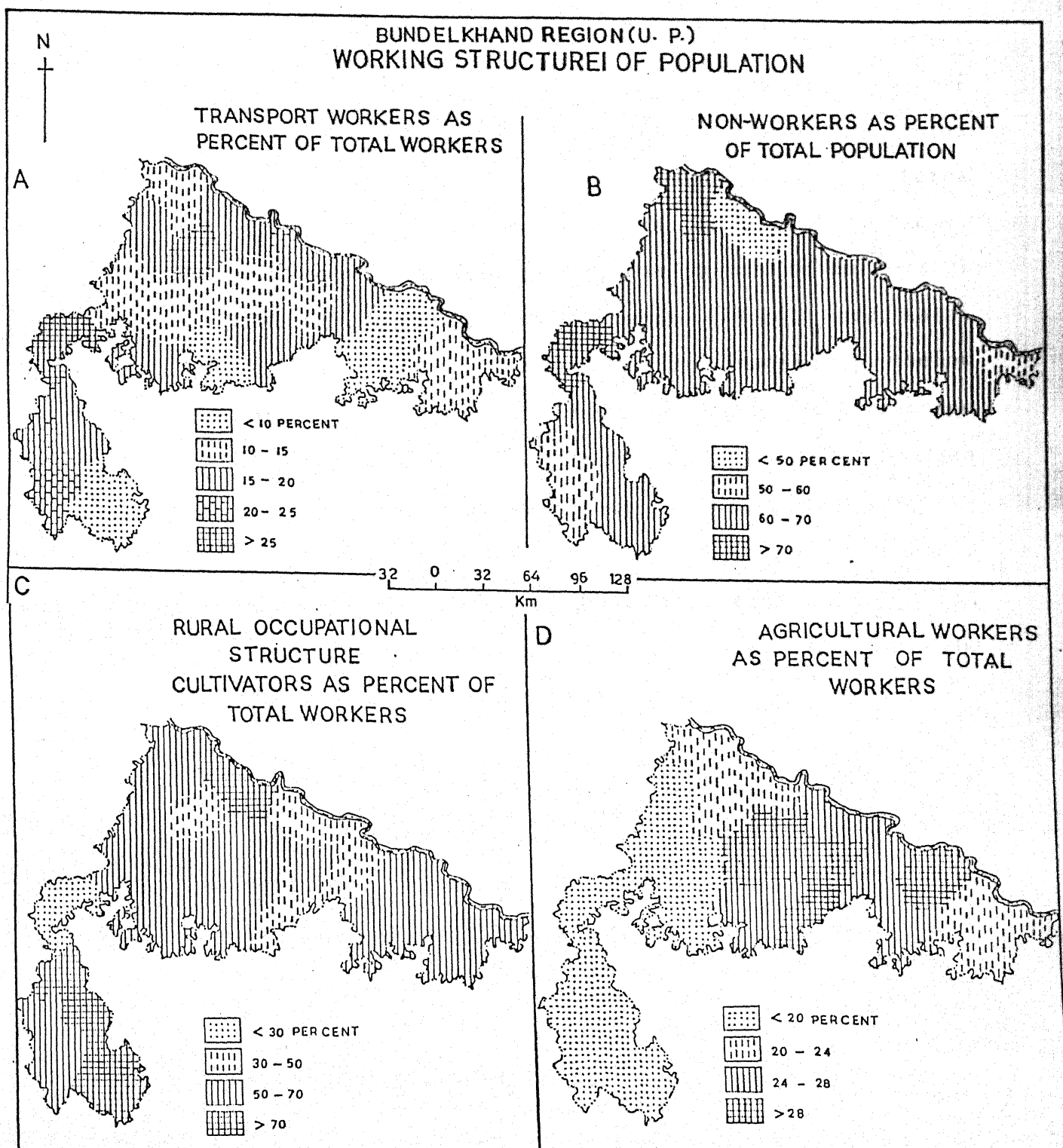


Fig. 1-10

figures (1.10C,D) depict the another type of working population. One points out the rural occupational structure of population in terms of per cent of cultivators to total workers. The highest percentage of cultivators is in Mehroni (79.30%), followed by Talbehat (73.24%) and Kalpi (72.25%) tahsils, and low in Jhansi (as below 30%) tahsil. Another indicates that the percentage of agricultural labourers is high in Maudaha (30.55%), followed by Baberu (29.42%), Rath (28.81%) and Mahoba (28.12%) tahsils and low in Jhansi and Lalitpur districts and Konch tahsil. In brief, the working structure of Man power moulds and infrastructure of the development.

Obviously the nature, organisation and growth-trends of both physical and cultural settings commulatively effect to the evolution of transport as dealt with ahead.

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CHAPTER - 2

EVOLUTION OF TRANSPORT

Transport is the back-bone of national economy. It provides an essential feature of all modern economies.¹ Any transportation net-work is a reflection of the contemporary spatial organization of economy, social conditions and political set-up². So transportation is an essence for the development of any region or country. It's past history cannot be ignored because it over influenced the development in the past. As the stages of the development of human-civilization marched, the transport systems got momentum. Godlund has aptly remarked, "it evolves gradually through the human history experiencing many stages-primary, diffusion condensation and saturation³. The basic unit of movement is a trip and man travels from one place to another for a particular purpose. Hence, economy and transport run simultaneously holding the geographical, social and political possibilities. Mayer has stressed, " the basic process of economy is circulation and transport interaction projects in future in a chain reaction. That is why, a trial of one period may become a super highway in another⁴. For this testimony, the example of Roman-pre-roads can be quoted.

Therefore, it is necessary that the systematic

analysis of existing transport network be constructed. Besides providing a dramatic insight into social change, is a necessary prelude to the study of existing transportation and formulation of the future pattern in a natural process of evolution⁵.

The Bundelkhand region lies in the core area of the country. That is but natural that the main arteries of Indian commerce which criss-crossed the region. Politically it achieved the strategic position during the upheaval days of the nation. Due to the geographical location of the region it was known as the 'gate way of the South India' since 12 to 17 century A.D. It was easily accessible from Northern Gangetic plain to South Deccan plateau. The system of transport in this tract getting changed and turned in the course of time. Conveniently the evolution of transport in this part of the region was categorised into four periods - ancient, medieval, british and modern.

In fact, the historical records of transport not only reveal the socio-economic development and political set-up of the region, but also through the light on the distributional pattern of arteries, mode of carriage, nature and characteristics of traffic flow.

THE ANCIENT PERIOD

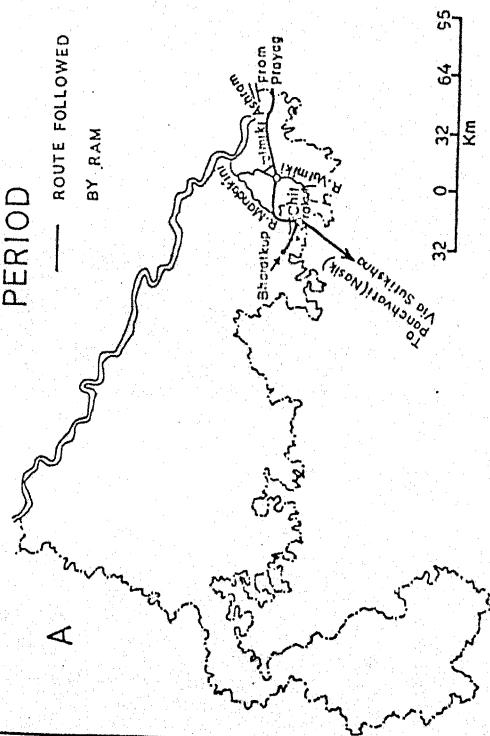
In Vedic period the inter-regional routes were introduced by the administrators to control the region. Jhansi, Orai, Banda, Kalinjar, Hamirpur, Kalpi and Lalitpur were the nodal centres and were linked with each other at that time. Kalinjar had acquired considerable importance as a place of pilgrimage even as early as the days of Mahabharat. There is very reason to believe that well laid roads must have passed through Kalinjar joining the central and eastern part of India. Being the cock-pit of the powers, the region controlled the land and Water routes both. Because, the region has been the 'battle-field' of many kings, so the movement and migration at the time of war took place from north-west to south-east.

The Aryan currents entered the land through the route of north-western part of the region. The Chedis (CHEDIS) one of the sixteenth Mahajan-padas of Northern India was extended between the Yamuna and Vindhya⁶. The Chambal, Betwa and Ken are the main streams vitalising the life of towns as well as the rural masses. However, some land-routes are also mentioned in Valmiki Ramayan, which are as following : -

ROADS IN DIFFERENT PERIODS

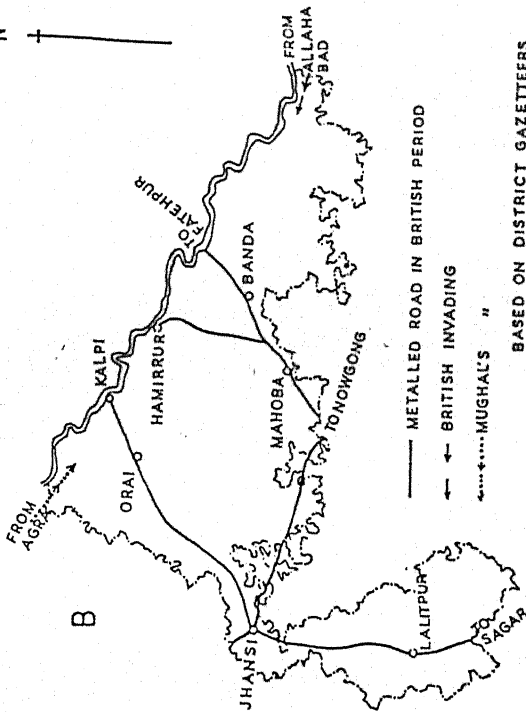
ROUTES IN RAMAYAN PERIOD

— ROUTE FOLLOWED BY RAM



BASED ON VALMIKI RAMAYAN

B



— METALLED ROAD IN BRITISH PERIOD
 - - - BRITISH INVADING
 MUGHAL'S "

BASED ON DISTRICT GAZETTEERS

D

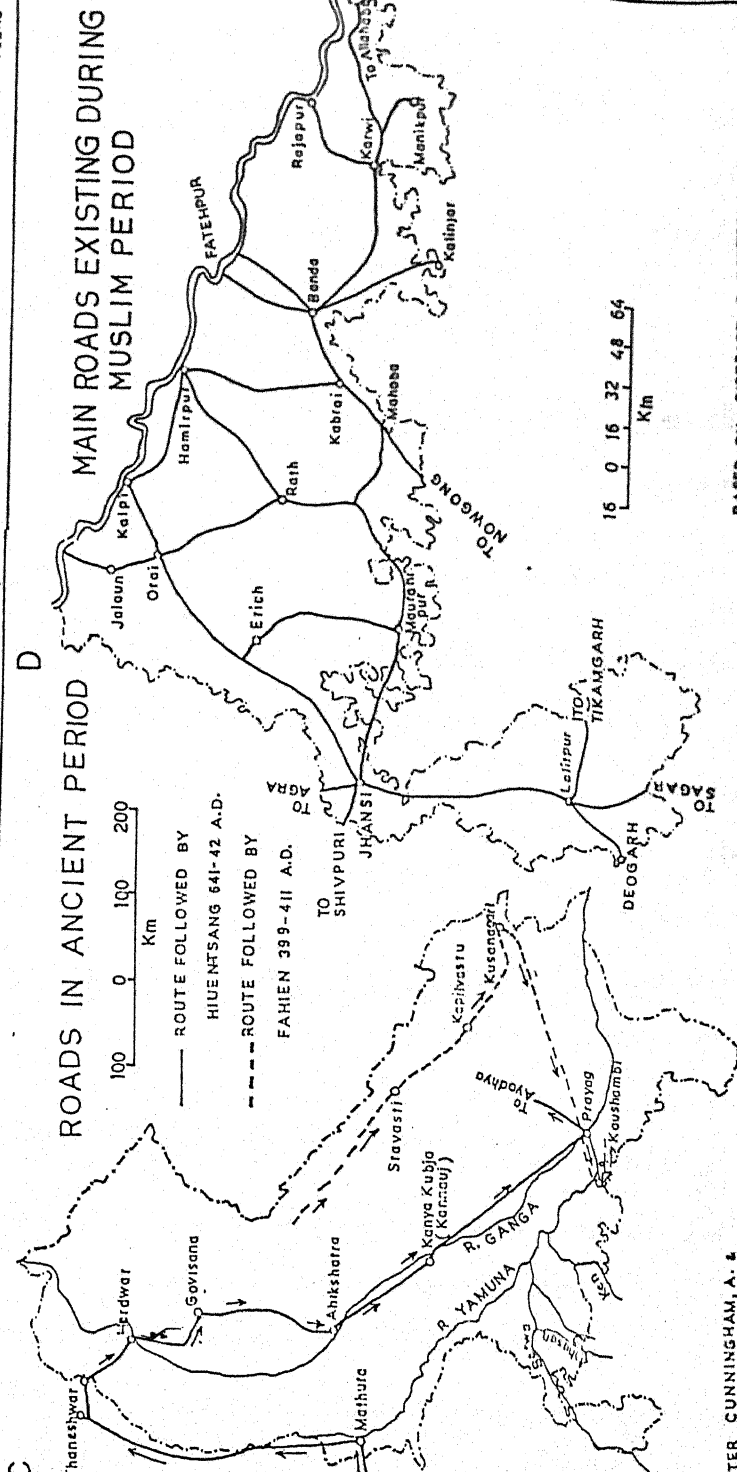
ROADS IN ANCIENT PERIOD

— ROUTE FOLLOWED BY

HIVENSANG 641-42 A.D.

- - - ROUTE FOLLOWED BY

FAHIAN 399-411 A.D.



MAIN ROADS EXISTING DURING MUSLIM PERIOD

16 0 16 32 48 64 Km

BASED ON DISTRICT GAZETTEERS

AFTER CUNNINGHAM, A. & PANDIT, Y.C.

Fig. 2.1

- (1) Ayodhya to Valmiki Ashram.
- (2) Ayodhya to Chitrakut (near Karwi Banda).
- (3) Ayodhya to Panchvati (near Bombay) via Chitrakut and further Lanka (Polan Narna, Ceylon).⁸.

The region has been an important battle field for many invaders, therefore, many routes were adopted from the region at the time of war. For instance Pururavas Aila, founder of Lunar race was the ruler of Pratisthana (Jhusi near Allahabad), which extended from Eastern Rajasthan via Gangetic Doab to the Jhansi Region⁹. Alongwith this kingdom the route was passed from east to west through the region. The several routes and towns were constructed by the Hindu emperors in the expansion of Buddhism religion. Besides this the roads were constructed and keenly well maintained in Maurya Period. The great highways such as Jhansi-Delhi, Jhansi-Kanpur, Jhansi-Sagar and Jhansi-Allahabad were the main routes during this time. Jhansi-Kanpur route linked with the Grand Trunk Road ran from Taxila on the north-western border to Patliputra. Jhansi-Sagar National route in 600 B.C. ran from Rajgriha via Pratisthana (Allahabad) and Vidisa on the Ujjain and Mahishmati, probably passed through the Southern

part of the Jhansi¹⁰. These roads in Gupta period continued to develop as it is evidenced by Chinese pilgrim Hiuen Tasang and Fahien¹¹(fig. 2.1C). Hiuen Tasang visited the parts of the region in 641-42 A.D. According to him this region was found for its fertility and its king was a Brahman who was a firm believer in Buddhism.¹².

Mostly the routes of the region passed through the river-sides, connecting important towns and religious and pilgrimage centres. Although these routes were unmetalled and rivers unbridged yet great care was taken and principles thereof were followed by the emperors of that time.

During the war period the military required more space to move the means of carriages. As Kautilya has classified the different types of routes and their width in Arthshastra. The 'Rath roads' or chariot roads, royal or Rajmargas, feeding or Sthaniya roads shall each be 24 ft. in width. Roads connecting to military campus, cremation grounds and village were also of the same width (24 ft.), and roads covering the elephant forest shall be 12 ft. The roads as Chariot, measured $7\frac{1}{2}$ ft. cattle 4 aratnis ($7\frac{1}{2}$ ft.) and road for minor quadrupeds and men 2 aratnis¹³.

The homogeneity of these rules, regularity, the width and the methods of construction is laid down in Sukraniti¹⁴. Moreover, the relative advantage of trade routes have been discussed from the stand point of contribution to the trade or commerce.

At that time mile-stone and sign-posts were fixed at regular intervals and to guide and guard, the route, Thal Niyamak (land pilots) were hired by traders.

History speaks that during the Maurya Dynasty transportational network contributed a lion's share role between the Bundelkhand and Magadh. The Jhansi-Kanpur, Jhansi-Delhi, Bhopal-Jhansi-Kalpi (meeting on to great Deccan Road) and Jhansi Allahabad routes linked with Grand Trunk-line, which led to Pataliputra. There were mainly two means of transportation viz. land and water, but latter was the centre of great attention, being advantageous, easy and comfortably safed transport.

The river Yamuna was only a navigable channel. The river Betwa, Dhasan and Ken were, perhaps, not fit for navigation, that time. All important towns commanded the river-routes. Deogarh (Betwa), Kalpi (Yamuna). Hamirpur, Rajapur (Yamuna)

and Banda (Ken) were religious, historical and civilized river towns of that period, other important towns like Jhansi, Orai, Rath, Mahoba and Kalinjar etc. were linked with the land-routes.

After the down-fall of Gupta's, in 5th and 6th centuries the transportation interrupted, but about 600 A.D. when Harsha set-up his strong reign, it revived again. Roads were constructed for merchandise of the region.

After the death of Harsha (647 A.D.) the region was handicapped and progress was rocked till seventh century. Therefore, semi-independent chieftains emerged i.e. Parivrajaka kings, Gond¹⁵ etc. Due to the security, provided by such centres handicrafts and commerce achieved a glorious chance of growth. Thus various towns like Jhansi, Lalitpur, Deogarh, Orai, Rath and Mahoba emerged under the Rajput Pratihars. Bullock-carts, pack-animals (horses, camels, elephants, mules, asses etc.) , boat palanquin were popular forms of land-transport. These were used by common people. But the 'Rath' (Chariot) was ranked as a carriage of honour¹⁶.

Naturally, traffic was valuable enough to stand the cost of transport by horses and camels

overlong distances and difficult routes. The main export items were textile, spices etc. and import items iron, sold, salt, horses etc. Army and pilgrims were the source of passenger traffic.

In brief, it can be said that in the ancient period the transport was in worse condition and non-power driven traffic-flow predominated. Roads were unmetalled and widely used during war-period without any carefully attention, whih was paid to them.

MEDIEVAL PERIOD

The reigon maintained its strategic position in the medieval period too. Due to its central position the routes were followed by Mughals, Marathas and Britishers mainly from the Gangetic plain to the Decan or from North to South and from Agra to Sagar and Allahabad via Jhansi.

During 1200-1389 many chieftains reigned over the region. In 1202, Qutb-ud-din-Aibak, ravaged the territory of Chandellas and attacked the fort of Kalinjar, placed it under the command of Hassan Arnal¹⁷. During sharqi-kingdom (1389-1500) the Erich, Kalpi (Jalaun), Jhansi, Chanderi (Jhansi), Lalitpur, Hamirpur and Banda were linked with Jaunpur

by main routes. After this, Lodi dynasty appeared and chanced the growth of transport-network in the region. Sher-Shah Suri, the master builder of roads to conquer region, and for military and administrative reasons, he must have laid down a well planned network of roads during his short period of reign (1540-45). With the exception of Akbar the Great all the successors of the muslim dynasty ravaged the land through the important land-routes. But the invaders did not pay attention to the improvement of transport.

The main centres of the region were inter-linked either by rivers or by roads. Akbar realised the need for construction of roads. Besides repairing the roads, constructed by Sher Shah Suri and Humayun, he also constructed the important roads. As R.B.Singh remarks "realising the importance and usefulness of good transport system he took up the difficult and costly scheme of Inland Transport¹⁸. The river navigation played an important role of communication. For instance, Erich fort was besieged by the imperial forces of Akbar to capture Bir Singh Deo, but he managed to escape one night by way of Betwa¹⁹. The chief routes passing through the region were-

1. Jhansi-Moth-Kalpi-Kanpur.
2. Jhansi-Nowgong.
3. Jhansi-Sagar,
4. Jhansi-Allahabad via Hamirpur and Banda.
5. Jhansi Gwalior-Agra-Delhi.
6. Kanpur-Hamirpur-Sagar via Mahoba.
7. Banda-Fatehpur - Sagar and
8. Fatehpur - Banda - Nowgong via Mahoba.

Akbar made the traffic easy and safe during his travelling and halting programmes. He used to issue orders for the plantation of trees on both sides of road, and construction of wells and 'Sarais'²⁰. There were no bridged and all weather roads. Because the nation faced 'a network of bridle paths' upon which in dry season pack-animals used to travelling, passengers walked or were carried in palanquins²¹. The region also became almost impassable by heavy-laden carts during the rainy and hot weathers and so the traffic was at a stand-still and reduced to small limits.²² The difficulty of terrain, robbers, dacoits and wild animals was avided at the cost of long curves²³.

In the region upto 1631, there was a lack of recognised route through Vindhyan tract,

because it was mountaineous and forested area. During Akbar's reign the pace of trade and commerce had increased and several towns were founded and industrialised in those days. Mauranipur (Jhansi), Lalitpur and Banda were connected with Agra, Kanpur, Allahabad and Bhopal (M.P.). In Jhansi textiles goods, weapons and agricultural implements were manufactured. Kustas (nomadic artisans) came to Jhansi from Gwalior State. They were patronised by the Maratha Colonel Sleeman who noticed that fine woolen carpets produced in Jhansi²⁴. Lalitpur, Mauranipur, Kalpi, Hamirpur and Banda were the famous trade-centres. The articles of trade were utensils, engravings on marble, ivory and silver, jewellery and ornaments, spices, fruits and other eatables.

After Akbar, the region was governed by many emperors or invaders i.e. Jahangir (1627), Shah Jahan (1627-50), Aurangzeb (1657-1707), Chhatrasal (1731) and Peshwa Baji Rao and Bundelas etc. During these rulers the region did not get a bright chance to develop the transport, due to warfare and invadings.

MODERN PERIOD (1757 - 1947)

For the convenience modern period can be classified into two groups -

- (A) The Transitional Period (1757 - 1857).
- (B) The period of Transport Revolution(1857 - 1947).

(A) THE TRANSITIONAL PERIOD :

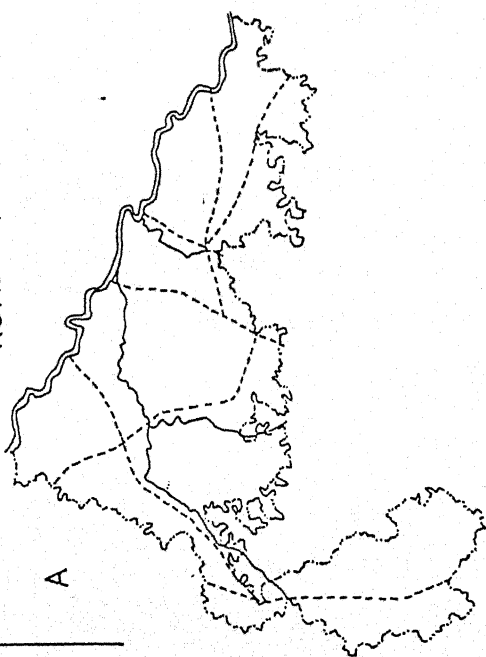
After the decade of Mughal and British empires several chieftains like Maratha (Madho Govind), Nawab (Shuja-ud-daulah) and Bundelas emerged in the region. They cared for fortification of towns and construction of roads under their dominion. Under Shuja-ud-daulah (the Nawab Vizir who considered himself the legitimate master of Bundelkhand being Viceroy of Allahabad) the region did not get a bright occasion for transport development. After 1731 the Marathas ruled over the principality. Jhansi, existing since the days of Jehangir, developed²⁵ after 1772 into a large town under the Marathas. W.W.Hunter, visited Jhansi in 1792 says, "It is frequented by caravans from the Deccan which go to Farrukhabad and other cities of doab"²⁶. A considerable trade of textile of Chanderi and Bundela's weapons like bows, arrows and spears, both were the source of an afflux of wealth²⁷. Owing to the copious nature of trade and commerce centres, a complicated road-network came into being (fig. 2.2). In 1803 the entire region transferred to the East India Company. During this time, an effort was made to hold the land owners responsible for the upkeep of the roads passing through their estates, but it did not work. The roads were then

sought to be improved by imposition of a road cess and the formation of a road and ferry fund committee to administer the proceeds. The unmetalled roads were not extended more than rapid progress. The river Yamuna was only the easiest and most speedy route for trade and commerce. Although Lord Willium Bentick quelled the 'Thugs', yet roads were insecured²⁸ and the company interested to lead to the quick development of river side marts like Kalpi, Hamirpur and Rajapur, on Yamuna-bank. Except Yamuna, there was no river, which could be navigated during the rains. The efforts of East India's bold policy of deepening and improving rivers, was a little²⁹ In this time the region was suffering from disturbance and exploitation under the British Government. In 1838 Gangadhar Rao and Krishna Rao were recognised, as a ruler³⁰. In 1839, Military Boards were set-up, and after it, P.W.D. created to look-after the roads. An attention was paid for a construction of good and bridged metalled roads, suitable for wheeled vehicles. The principal road was Jhansi-Kanpur via Moth and Kalpi, connected with G.T. Road. Other established trade-routes from Jhansi were : -

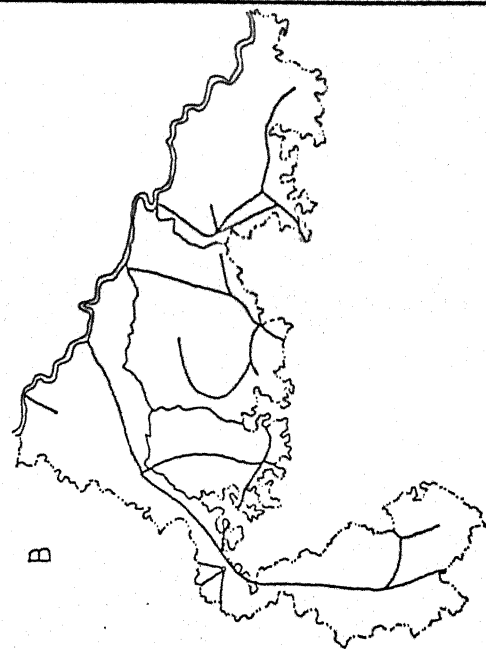
- i) Jhansi to Sagar connecting with Great Deccan Road.

BUNDELKHAND REGION(U.P.) EVOLUTION OF ROADS AND RAILS

ROADS IN 1780



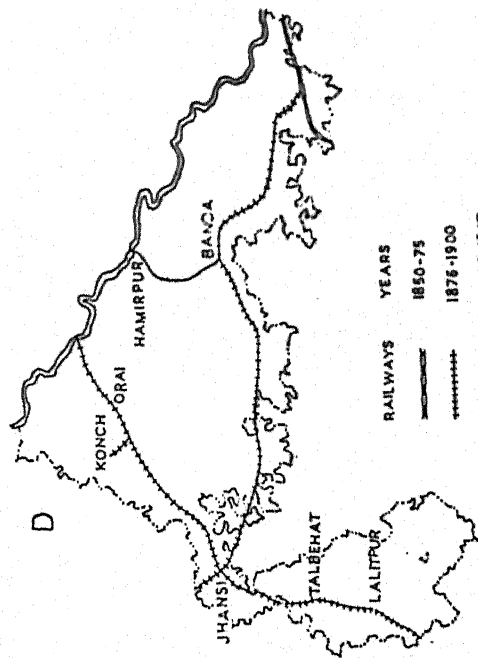
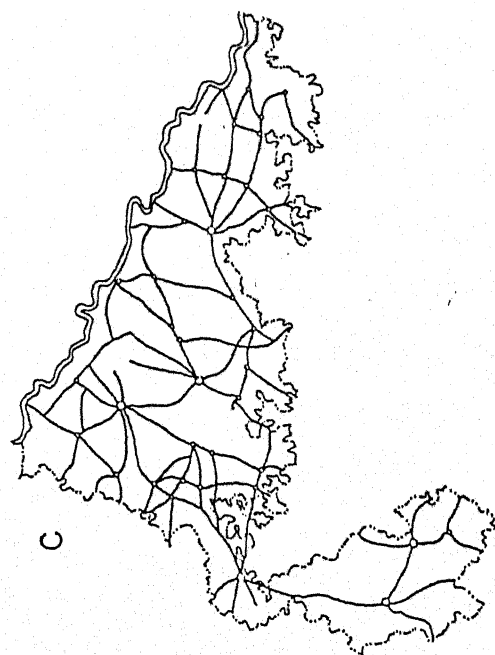
ROADS IN 1920



32 0 32 64 96
Km

EVOLUTION OF RAILWAYS

MAIN ROADS IN 1985



RAILWAYS YEARS
1850-75
1876-1900
AFTER 1947

Fig. 2-2

- ii) Jhansi-Shivpuri.
- iii) Jhansi-Delhi, and
- iv) Jhansi-Mirzapur via Mahoba and Banda.

The nature of traffic was different within the Region. In the earliest days of British occupation Mauranipur was the largest trade emporium. Except Mauranipur, Jhansi and Lalitpur reached its zenith about 1840, when they attracted a large share of cotton goods, grains, pulses, oil-seeds and ghee commodities of trade from the south-east and north-west directions. The merchandises of different regions overlapped the region. The agents of trade came into the region from Mirzapur - the boats that in those days plied over the Jamuna returned to Rajapur, Kalpi ----- freighted with sugar, rice and cloth in exchange for the cotton and grain³¹. Kalpi and Konch other prosperous trade-centres. The chief articles of trade were cotton and ghee exported by the river Yamuna to Allahabad, Mirzapur and Patna. The company took care of a cotton agency at Kalpi till 1930. The Jhansi-Kalpi trade-line was the prominent route because in 1854 the principal metalled road was Jhansi to Kanpur via Moth and Kalpi. The road was bridged throughout in length, and the nature of traffic was good. From the west large trade in

cotton is carried on, all of which is conveyed to Kalpi in exchange for which, the carts etc. return laden with sugar, 'Kirana etc. From the west traffic in cement, sugar and iron etc. is huge³².

(B) THE PERIOD OF TRANSPORT REVOLUTION (1857-1947).

It may be looked into two sub-divisions

- (i) The period of Arterial Growth (1857-1925) and
- (ii) The period of Repurcussion (1925- 1947).

(i) THE PERIOD OF ARTERIAL GROWTH (1857-1925).

This is the period of struggle, sacrifice and beginning of first war for the freedom of the nation. But the troops of British Government ravaged the region and suppressed it upto a great extent. In 1857 Maharani Lakshmi Bai took up the lead of the territory and faced the British Army. During this time the company thought to construct the metalled roads and railways for the suppression of rebellion. Because by this it was possible to contact easily from one place to another, without

delay. due to the development of roads the trade-routes changed and some of the commerce diverted to new highways. Small market centres which were detached from roads or rails lost their importance. In brief, the trade flew along the new arteries of roads and railways.

DEVELOPMENT OF RAILWAYS

U.P. Bundelkhand came into being in the railway map of India in the sixties of the 19th Century (fig. 2.2D). The first railway line was laid down in 1875, between Bargarh and Markundi named as Allahabad-Bombay main line. After it, Jhansi-Manikpur railway-line constructed during 1885-87. Jhansi was the important junction because the Great Indian Peninsula Railway also expanded its line from Itarsi to Kanpur and to Agra via Jhansi during the same period in order to facilitate quick communication between Northern India and Bombay.³³ By the end of 1887 Jhansi was well connected with Kanpur (via Orai, Kalpi), Allahabad (Via Banda, Manikpur), Bombay (via Lalitpur) and Delhi (Via Karari) centres. During this period the agricultural tract of Malwa and hilly plateau land belonging to Vindhyan tract, were linked with each other. Only the northern parts of Hamirpur and Banda districts were apart from it. It was the bright luck that the region

was served by the broad gauge (5' 6"), throughout. The interconnected lines were constructed after 1925. Some of them are branch lines, constructed under the Indian Branch Railway Company, which later on was acquired by the State on January 31, 1889. On 5th November 1951, the Indian Government created the Central Railway Zone, and G.I.P.R. merged in this newly created Central Railway. Now only Central Railway is serving in the region.

Following are the factors which have affected the rail-growth in the region : -

- 1) The British wanted to suppress the rebellion of 1857, therefore, they paid much attention to the construction of roads and railways for the quick movement of their military force³⁴.
- 2) The British wanted to exploit the regional resources for the industries in England. Therefore, they constructed parallel roads and railways.³⁵
- 3) For administrative convenience it was necessary to have a good accessibility within the region.

- 4) The natural hazards like droughts, floods and famines encouraged the road and railway development to mitigate their dangers tunily and properly.
- 5) The plain areas of the region encouraged the transport system for the faster movement of their farm products.

DEVELOPMENT OF ROADS

It is a matter of great concern that the study of such a subject like road transport has remained much neglected in our country. In fact the life blood of a region flows through its arteries of roads. Road transport is one of the great material needs of a man. As Davis remarks "One of the earliest problems of the man was how to move himself and his possessions. Even in the primitive people this problem existed as they had to go in search of pray³⁶. In present, when the country is marching towards industrialization, roads are playing a very significant role.

The region has witnessed an organised and civilized life from very early times. For such a region the quick transportation is pre-requisite. As rail was extended, it was necessary to construct

feeder roads and demand for metalled roads soundly emerged. The old routes were superseded by the railways and rails influenced the region. But the railways helped the road-construction and developing the traffic to be carried. Besides, Military Boards and Public Works Departments, the Local Self Government also intended to improve local transport. In 1908 the roads were classed as provincial and local. But for the first time the roads were classified as below : -

CLASS I METALLED :

- (a) Bridged and drained throughout.
- (b) Partially bridged and drained.

CLASS II UNMETALLED :

- (a) Bridged and drained throughout.
- (b) Partially bridged and drained.

CLASS III :

Banked and surfaced but not drained.

CLASS IV :

Banked but not surfaed, partially bridged and drained.

CLASS V :

Cleared and partially bridged and drained.

CLASS VI : Cleared only.

NATURE OF ROADS

Except the plain area, the rest part of the region is rich in stone and gravels. Therefore, the roads have been constructed with stones, gravels and pebbles. In the vast plain area the roads were constructed with stones and broken bricks, available every where.

Till the early years of the twentieth century roads in the region were generally stony and in places were impeded with rocks and boulders. The cost of building roads was maintained by the Public Works Department or District Board, or Country through which they pass. The roads became expensive in the region where, crossed by rivulets and streams, very few had bridged and culverts posing a serious problem for the traffic during the monsoon due to lack of necessary embankment and the inferior of the metalling. The emergence of roads has been depicted in Fig. 2.2.

The roads and railways together entirely changed the method of transportation by the year of 1925; because the pack animals were suppressed by wheeled auto vehicles throughout the region.

INLAND NAVIGATION

The regional drainage system is poor for navigation because of the shallow and rocky bed of rivers. Among the streams, the Yamuna is the only navigable river throughout the year. The Northern skirts of the river have a better opportunities to develop waterways. Beside the Yamuna the bed of Betwa is mostly of rocky nature having steepy banks and fordable at a few points. The Dhasan is bounded by a belt of ravines about two or three miles in breadth. The river Ken is also slightly important for Banda district.

In brief, these rivers are less useful for water transport specially for boating and steamer driving. Only a few places like Chilla, Augasi, Marka and Rajapur are the suitable places for steamer and boat transport. By the end of 19th century the construction of the railways and the development of road transport in the region have reduced the importance of insecured and slow water traffic by rivers. The loading capacity of boats on the rivers is shown in fig. 1.3B.

(2) THE PERIOD OF REPURGUSSION- (1925-1947).

Due to political upheaval the region was very disturbed and unsettled. The present rail

network contributed a lion's share for re-adjustment and improvements by 1925. During this period, owing to many causes like Second World War, economic depression of 1929-30 etc. the impact of rail was constantly interrupted. The railways were nationalised in 1924, and Acworth Committee's report suggested some attempts for a better development of railways. Automobiles also emerged by now, but the railways had a virtual monopoly. The road transport was dwarfed until the initiation of the Nagpur plan of 1943³⁷ for road development.

As mentioned earlier, England was the main market for the raw materials resources of India. Therefore, for the speedy exploitation of Indian resources, the Britishers developed a railway network in India. The raw materials were exported and the furnished products were imported and sold in Indian markets at high rates. For this dual benefit the Britishers gave top priority for the development of rail reticule in the region.

In brief, the transportation, within the region denotes its changing pattern, availability and forces working underneath. The present transport

network is the legacy of the past. After 1947 the government paid much attention to develop a better transport network. An integrated programme of road development began since 1951 with the commencement of the First Five Year Plan³⁸.

The following lines describes some of the government efforts : -

- (i) The roads have now penetrated into the inaccessible areas to utilize the regional raw materials.
- (ii) The most significant road reticule is formed by the inter-regional roads which run almost parallel to the railways.
- (iii) The bridge corporation has constructed a lot of bridges over the regional streams to connect the nodal points and facilitate the motor vehicles. Therefore, straight roads appear to have more traffic flow than the circular roads.
- (iv) In free India several roads such of State, District, Municipal Board, village and feeder roads are constructed for the movement

of men and goods.

- (v) Although the waterways is insignificant but hydroelectric is generated by the Matatila multi-purpose project which has bright chance for electrification of railays.

In Conclusion, it may be said that the region, belonging an agrarian and backward economy, maintains a poor transport system. For its industrial as well as integrated development, a sound transport policy should be made so as the chronic diseases of transportation would be suppressed.

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CHAPTER-3

THE DISTRIBUTIONAL PATTERN OF MODES

THE RAILWAY RETICULE :

The broad gauge is a distinct system of railways. Such railway reticule covers the whole region. The broad gauge system of the area belongs entirely to the Central Railway. (Fig. 3.1).

THE CENTRAL RAILWAY :

It spreads all over the region and gives a better service to the plain and hilly tracts of the region. The important lines of this system are; Allahabad-Bombay via Manikpur, Jhansi-Manikpur via Banda, Jhansi-Kanpur, Jhansi-Bombay via Lalitpur, Jhansi-Delhi and Lucknow-Jabalpur via Banda. These lines of Central Railway touch the Northern Railway at Kanpur, and the Northern Eastern Railway at Allahabad, but do not form an integrated system in itself. There are mainly two systems, first radial emerging from Jhansi junction to Delhi, Kanpur, Manikpur, Lalitpur centres and the second vertically connects the Jhansi-Manikpur railway-line from Kanpur line at Khairar (Banda) centre and the same at Manikpur from Bombay. In addition to these two main systems, it exists a system of Jhansi-Kanpur line diagonally

interlinks the Jhansi-Banda and Kanpur-Banda lines. The junction points of Jhansi, Banda and Manikpur provide the inter-region connections of the region as well as the country.

TRACKAGE :

The rail transport like road transport differs more in traffic bearing capacity dependent upon the type of gauge, the number of tracks and the motive power used. The whole region makes up broad-gauge single-track line. These lines are - (i) Allahabad-Manikpur-Bombay connecting the eastern and southern cultures from the Vindhyan, (ii) Banda-Kanpur-Lucknow connecting the two industrial and agricultural lands, (iii) Jhansi Banda-Manikpur and (iv) Delhi-Jhansi-Lalitpur and Jhansi-Kanpur via Kalpi. The electricification of Delhi-Jhansi-Bombay line has put it much ahead of the others as regards the much traffic carrying capacity. Other railway lines have become less competitive because of their diesel or coal traction.

CHARACTERISTICS OF RAILWAY LINES:

These are some fundamental features, which strongly affect and determine the frame of transport network of any nation. These are-

the nature of tract, pattern of curves and gradient, frequency of tunnels and bridges, passes and the bulk of cutting and filling¹ upon which the transport with its smooth and efficient working power is dependent. Because rough tracks, sharp curves and steep gradients are the ban of fast running². In the region, the Bundelkhand upland suffers from most of these obstructing factors, but the lowland does not, being mostly a gently rolling plain.

Fig. 3.1 reveals the longitudinal profile, the curve and gradient of four railway-lines, viz. - Jhansi-Manikpur, Jhansi-Kalpi, Jhansi-Lalitpur and Banda-Hamirpur in two distinct topographical units, lie in the low land and upland of the Bundelkhand region.

In these railway lines the fundamental features have been emerged such as sharpest curve and gradient as well as general ruling curve and gradient.

The main attributes of the railway lines different sections have been dealt with in brief*. In fig. 3.1 several curves have sketched but the sharpest curve in the Railway is 4.5° i.e.
 * A Regional Manager Report, Central Railway, Jhansi.

1' in 1295' between Karwi and Manikpur with the sharpest gradient of 1:125 . The general ruling gradient is 1:125 between Orchha-Barwa-Sagar, Newari-Barwa-Sagar, Teharka-Ranipur Road, Harpalpur-Rora and Harpalpur-Belatal. In Jhansi Division the slowest curve of 1% is found in the Jhansi-Kalpi section between Jhansi-Garhmau and Parichha-Chirgaon with the general ruling gradient of 1:200.

Alongwith the review of gradients and curves of different railway lines in Bundelkhand Region it is clear that excluding the Bundelkhand upland, the remaining part of the region to a great extent is free from curves and gradients. It is remarkable to note here that railway lines are parallel to big rivers or have followed the water-shed lines of the small rivers, such as Jhansi-Lalitpur and Jhansi-Kalpi are parallel to the river Betwa, debouching in the trunk channel of the Yamuna. These lines traverse in south of north-east direction. Jhansi-Manikpur (via Banda) railwayline traverses from west to east direction in upland tract of the region. This line does not follow the regional water lines. Banda-Kanpur railway line traverses from south to north direction in parallel to

the rivers. In brief, the general movement of railways is from south to north, north-east and north-west to east directions. During the march past the railway-lines cross numerous rivulets and trunk channels like the Betwa, Dhasan, Chambal, Ken etc. The Jhansi-Manikpur line connects a chain of Allahabad-Bombay and Jhansi-Bombay railway lines.

RAIL DENSITY

Fig. 3.2 shows the extent of regional development of railway lines in different categories of density,* considering two main views; first expanding the area and second the degree of density. The areas of high density are as below:-

- (A) The highest density of beyond 25 kilometres (256 Km^2) occurs only at Jhansi and Manikpur places, covering an area of 512 km^2
- (B) The second category of 20-25 kilometres (256 Km^2) is found at several places of Banda, Hamirpur, Jalaun plains and Bundelkhand upland. These are: -

* Finding out the rail-density the region has been divided into squares of uniform area (approx. 256 Km^2). The rail mileage in each square has been measured and plotted in figure 3.2.

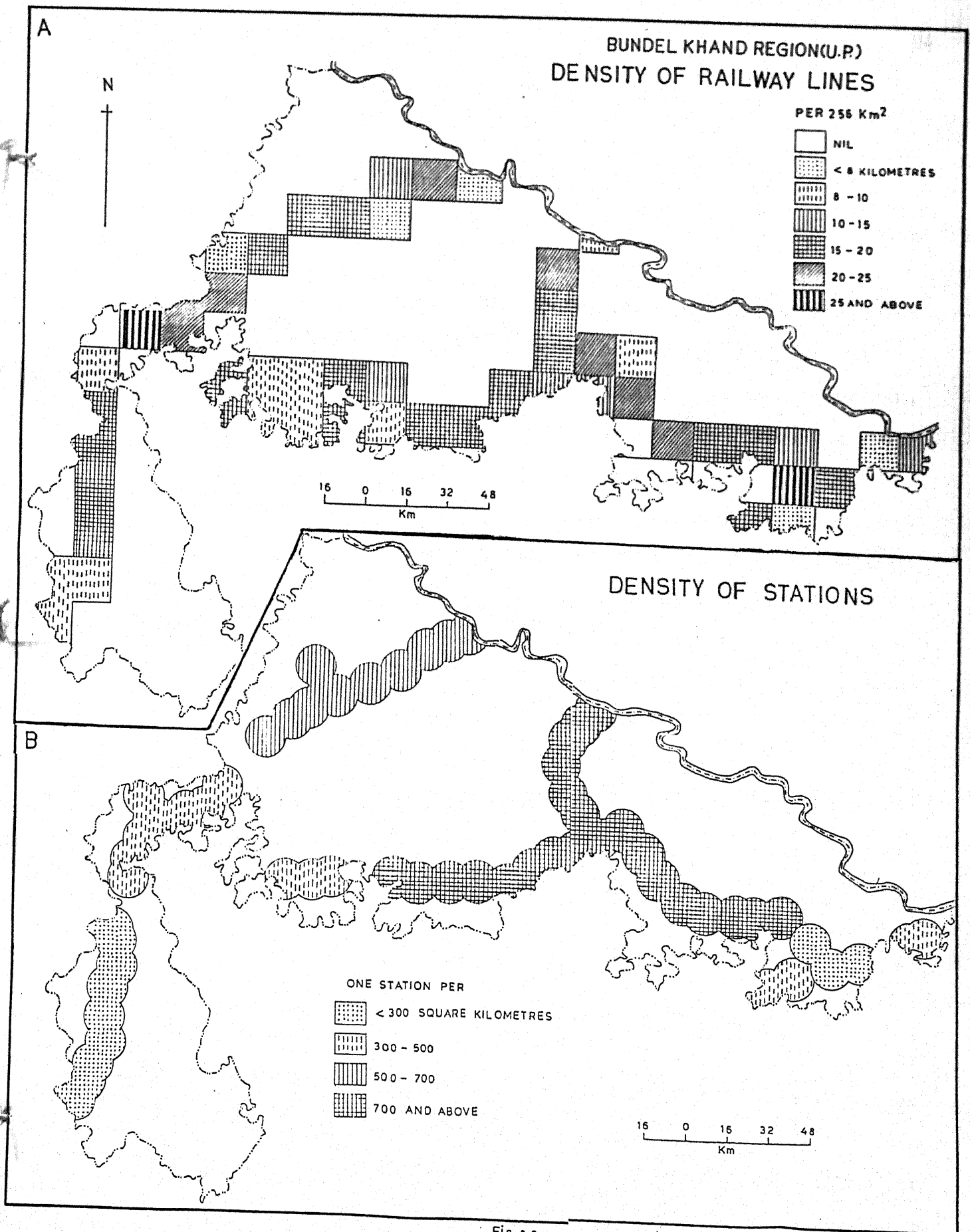


Fig. 3-2

- (i) The belt around Atarra, Khurhand and Dingwahi stretching over 512 Km^2 .
- (ii) The belt around Banda, Khairar covering an area of 256 Km^2 .
- (iii) The belt around Bharwa-Sumerpur occupying the similar area of 256 Km^2 .
- (iv) The elongated belt around Parichha and Chirgaon covers an area of 512 Km^2 .
- (C) The third category of 15-20 kilometres happens around Markundi, Panhai, Bharatkup, Chitrakut Dham Karwi, Ichauli, Akona and an elongated belt of Kulpahar, Charkhari, Mahoba, Rora, Orchha-Barwasagar, Matatila, Talbehata, Jakhaura, Delwara, Erich-road, Parauna, Ait and Bhua covering an area of 4200 Km^2 .
- (D) The fourth category of 10-15 kilometres occurs around Bahilpurva, Bargarh, Kabrai, Ghutai, Khajraha and Orai covering an area of 1080 Km^2 .
- (E) The remaining two categories are in elongated strips, showing merely the linkages of lines. Where these lines straightly run the density is 8-10 Kilometres per 256 Km^2 , and where run winding the density takes place 8

kilometres per 256 Km²., because the mileage is shared by squares. Lalitpur, Dhaura, Kalpi, Yamuna-South Bank, Moth etc., follow this category.

For the variation of density of railway lines, the two factors feasibility and demand are most responsible.³. In Bundelkhand upland, the feasibility is less because of great terrain friction and less demand. Only Jhansi and Manikpur junctions have great feasibility being nodal points of high-rank. The remaining part of upland tract is less feasible having poor economy.

The lowland or plainy tract has smooth gradient generally 1:300 and so there is about same feasibility everywhere.

Although the variation in degree of density is the result of variation in the degree of demand, but other factors such as historical views, chance-convergence, religious importance and nodality are also responsible for such variation. As stated earlier that Jhansi is well connected with Bombay via Lalitpur, Allahabad via Manikpur and Kanpur via Kalpi. This connection came into light due to the historical forces

and was built in the beginning by private company (G.I.P.R.).

Similarly Banda and Kalpi maintain high density primarily because of the chance convergence. Religious importance and nodality are other fundamental factors affecting the degree of density. The nodal points like Jhansi, Banda and Manikpur come into this consideration. Here the degree of density is higher (25 Kilometres per 256 Km^2).

DENSITY OF STATIONS

In measuring the density of stations it has been assumed that a transport artery serves effectively only upto 8 kilometres on its both sides. In case of railways this 8 kilometres distance has been drawn in relation to the stations, because rail serves through the stations. The stations providing a service area of 8 kilometres overlapped one over the other have been considered into one unit. This unit represents a homogeneous distribution of stations. The total area of the unit has been calculated and after the area per station has been found up.

Fig. 3.2 depicts the four categories

of density of stations in relation to areas which are served.

- (a) The lowest density of stations; i.e. one station per 700 km and above, is got in isolated patches which extends from Bundelkhand gneissic plateau in the district of Hamirpur to Banda plateau in Banda district. This density is also elongated upto ravine land in the district of Hamirpur.
- (b) The second category of one station per 500-700 Km covers the whole of the Jalaun plain and transitional belt of Jalaun district.
- (c) The third category of one station per 300-500 Km occupies the areas of scattered belts of Banda plateau of Bargarh and Markundi sections, the gneissic plateau of Jhansi district including Mauranipur, Babina and Jhansi sections, the triangular belt of Parichha in Jhansi district.
- (d) The highest density of stations lies between the Bundelkhand Gneissic plateau in the district of Lalitpur and Banda plateau around Manikpur section in the district Banda.

With the above lines the variation of degree of rail service totally depends on two

variables: (i) population density and (ii) economic development.

Thus, the areas of high population density like Jhansi, Mauraipur, Lalitpur and Manikpur (Karwi) centres carry the high density of stations and the remaining part of the region being very backward and sparsely peopled falls under the low density of stations.

INCIDENCE OF POPULATION

Fig. 3.1 represents the incidence of population per station which formulates how much is the pressure of population on one station to understand the actual degree of rail service in different parts of the region. In preparation of such a map the number of persons living in a unit has been counted from the population map (fig. 1.9) and divided by the number of stations and then the pressure of population on a station be resulted.

Though a station does not necessarily provide an inferior service, but there is a variation among them having to serve better facilities and more frequency of trains than the others having not the same. Generally, all the stations are of the same type except a few

big ones. It indicates the area where more stations or high frequency of trains, is desired.

Fig. 3.1 gives an idea of differences in the rail service to the people. The correlation is based on both the two variables; viz. distribution of population and distributions of stations. In the map such areas which are densely populated and have low density of stations, are certainly less served by rail.

The best served area lies between Matatila and Dhaura via Lalitpur where pressure of population is below 20 thousand persons per station comes under the first category of rail pressure.

The second category having 20-25 thousand persons per station occurs around Manikpur Bargarh section.

The third category having 25-30 thousand persons per station stretches over from Bundelkhand upland to Hamirpur plain between Ghutai-Mahoba-Banda-Atarra-Karwi and Khairar-Ragaul-Yamuna South Bank.

The fourth or the highest incidence of population (above 30 thousand persons) per

station lies in several parts of the region as around Moth to Kalpi via Ait junction and Orai in the Jalaun plain, Chirgaon to Khajraha via Jhansi in transitional belt, Rora-Ranipur-road in Bundelkhand Gneissic plateau and around Markundi section in Banda plateau.

Fig. 3.1B pictures an another type of incidence of population during 1971-81. It clears that with the increasing of population its pressure on railway also increases. In 1971, the incidence of population was low by 5088 persons per Km in Jhansi district and the highest 9920 persons per Km. in Jalaun. In 1981, the pressure of population has varied than that of 1971, as in Jhansi was 6625 persons per Km. and 12042 persons per Km. in Jalaun. During these years the region bears a pressure of population of 6209 and 8548 persons per Km. of rail-line.

The foregoing study reveals that the region is covered by the single railway system which is responsible for delay to traffic-flow running on regarded railway lines. Grasping into account the two features, the density of stations and the incidence of population per

station, eastern Bundelkhand (around Manikpur), the transitional belt (around Jhansi) and southern part (Lalitpur-Jhansi) are well served by rail transport.

THE ROAD SYSTEM

THE ROAD PATTERN:

Generally, the fundamental feature of the interregional road system is that most of the roads run parallel to the railways. So the road net also follows the railway system. However, the different types of local roads generate different patterns in the existing areas. About the importance of road pattern Kendall remarks - "the pattern of routes is like the visible part of the matrix in which the individual tiles are set. Though routes appear superficially to be separators, their function like the materials which holds one tile to the other in a mass is to unite the whole to tie together the great variety of the human habitat into one pattern".⁴ The pattern of road net is the result of the various geographical factors. These are landscapes, vegetation, water bodies, soils and other various features of cultural settings all have their effect on the position of the roads upon the land.⁵ In Bundelkhand (U.P.) the road transport is hampered

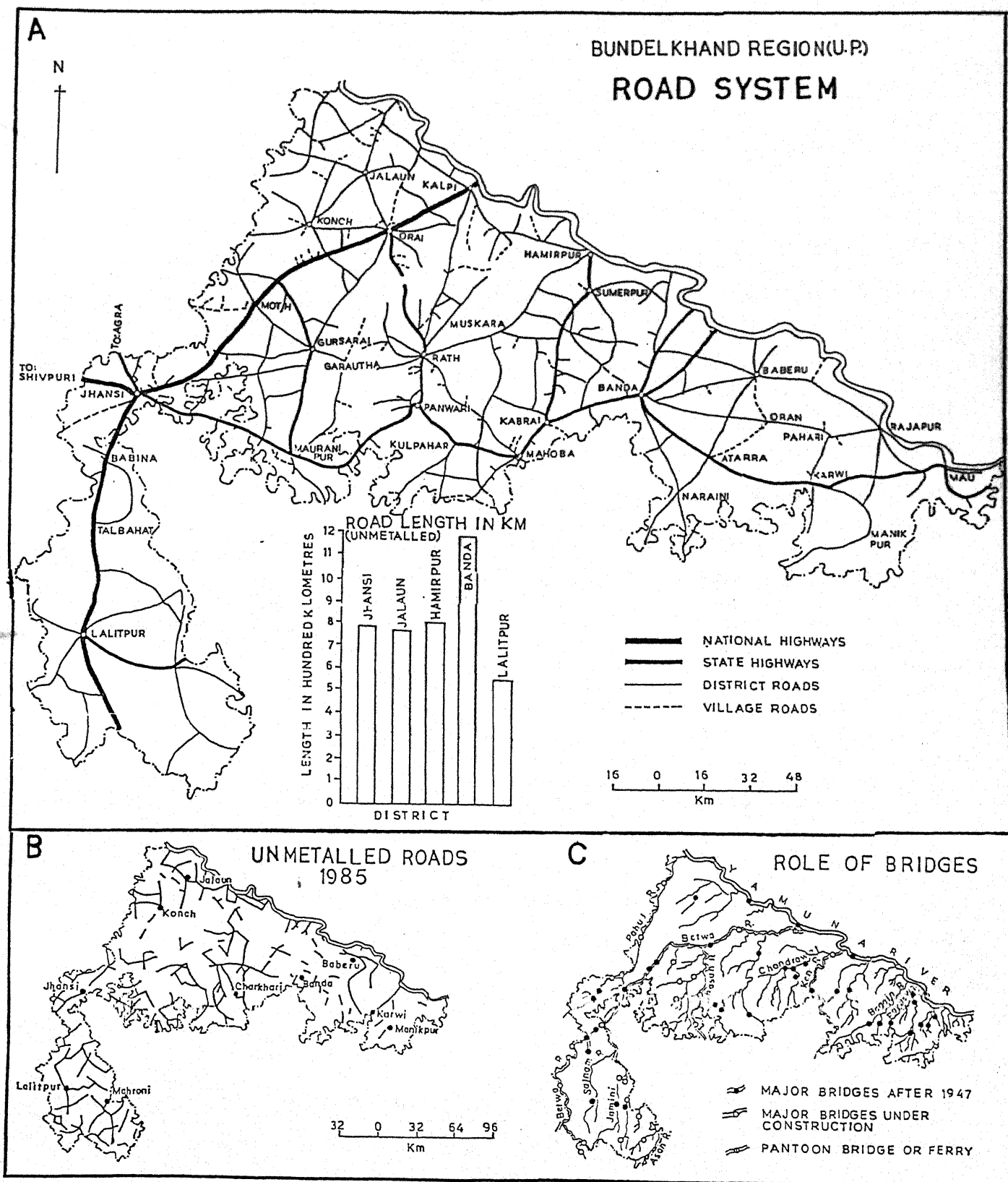


Fig.3-3

mostly due to the stoney uneven surface, dense vegetal cover and lands eroded by Betwa, Dhasan and Ken.

A hasty view at the road map of the region (Fig. 3.3) reveals the following different pattern of roads.

- (i) RADIAL PATTERN: The Lalitpur Upland and Jalaun plain have a radial pattern of road system. This pattern exists around Lalitpur, Jhansi, Orai and Jalaun centres. These are the nodal centres which sunk the link roads from the different directions. Such as in Lalitpur from Jakhaura, Jakhlaun, Gona, Mahroni, Bansi and Banpur, in Jhansi from Shivpuri, Agra, Barwasagar and Baragaon, in Orai from Jalaun, Kalpi, Konch, Ait, Kotara, Panwari and in Jalaun centre from Konch, Orai, Kalkpi and Auraiya are sprout. Within this huge pattern many other transverse and oblique roads are interwoven.
- (ii) DENTRITIC PATTERN: This pattern is overlapping in Banda plain and Bundelkhand upland as well as in transitional belt around Panwari and Rath plain in Hamirpur district. Important roads such as Mahoba-

Kulpahar-Panwari, Panwari-Rath, Rath-Muskara and Panwari-Mauranipur with other oblique or transverse branch-roads construct such pattern.

In Banda plain, Kabrai-Banda, Banda-Bahraech, Banda-Fatehpur, Banda-Baberu, Banda-Pahari, Banda-Atarra and Banda-Naraini roads also fall under this pattern. Within this system the radial pattern of Baberu centre and diagonal pattern of Banda-Oran and Banda-Atarra have also emerged.

- (iii) LATTICE PATTERN: Such road pattern lies in the lowland region specially in Hamirpur plain and transitional tract of Moth-Mauranipur where important roads run almost parallel from north to south, transected by east-west parallel roads and other diagonal roads. Longitudinal or main roads are Hamirpur-Muskara-Srinagar via Charkhari, Sumerpur-Kabrai via Maudaha in Hamirpur plain and Moth-Jhansi via Chirgaon, Kotara-Mauranipur via Gursarai in transitional belt in Jhansi district. These roads are crossed by latitudinal roads such as

Chhani-Ingohta, Bibar-Maudaha, Muskara-Maudaha, Charkhari-Kabrai via Rewai, Pandwaha-Vijana, Bhasneh-Baragaon and Gursarai-Chirgaon. These diagonal and radial patterns of roads ultimately complete this system.

- (iv) FORK PATTERN: In the Hamirpur-Banda plain and the transitional belt of Jhansi, a fork pattern of road system has been developed. The road linking Mauranipur, Bangara, Barwasagar and further extending upto Jhansi via Sanora and Talpura forms the one arm and the road joining Mauranipur, Fatehpur, Pandwaha and further upto Gursarai almost running parallel to the river Dhasan forms the other arm of the fork. This system also developed on Banda-Hamirpur highway where the Road Kabrai-Sumerpur via Maudaha forms its one arm and Kabrai-Banda running parallel to the rail forms the other arm.
- (v) RIB PATTERN: This pattern is found in plain and plateau land of Banda tract carrying the underdeveloped areas. Banda-Kalinjar via Naraini, Banda-Manikpur via Karwi,

Banda-Mau via Karwi-Raipura are the backbone of traffic. Several tentacles emerged from these roads join the M.P. border in the south and Allahabad border in the east.

For the development of these patterns, the following factors singly or cummulatively are responsible.

- (a) THE DRAINAGE PATTERN: The drainage pattern has played an important role in forming the various road patterns in Bundelkhand lowland and upland surface. Because the rivers often flow towards the slope of the land and, therefore, the roads run also in their pattern. The national highway Kalpi-Guna runs to the parallel of river Betwa via Jhansi and Lalitpur. It has occurred a lattice pattern between Betwa and Dhasan, Chandrawal and Ken with their tributeries in transitional and plained area. The radial pattern of Lalitpur, Orai, Jalaun follows the course of river Betwa. The river Dhasan and Keolary produce a dendritic pattern running almost parallel to each other except for a little distance near their confluences. In Banda plain,

except two main roads Banda-Bahraech and Banda-Fatehpur, the roads as Banda-Allahabad, Banda-Manikpur, Banda-Pahari via Bisanda and Banda-Baberu-Rajapur are not parallel to rivers, but are latitudinals. In Deogarh, Jhansi, Ait, Konch, Mahoba and Kalinjar centres the historic and difficult terrain are other factors, which affect the development of road system.

- (b) EMERGENCE OF IMPORTANT TOWNS: As stressed before the region was well known as "the Gateway of India", the connection of roads between southern and northern India was well noted. Being 'battle field' the roads were also constructed numerously. Besides, various towns which emerged in different periods have been linked by each other. During the last step of evolution the important centres like Jhansi (1867), Lalitpur (1870), Mauranipur (1868), Hamirpur (1871), Banda (1865), Karwi (1860) etc. emerged and they have been linked with the main road by road- tentacles. Within the region many road tentacles have sprung up on the lowland and upland tract mainly because of the recent origin of the new

towns like Charkhari, Rath, Kulpahar, Manikpur and Oran, connected with the head quarters or trade centres.

(c) THE NATURAL CALMITIES AND RAILWAY GROWTH:

Both have played their important role in the structure of present road patterns. During drought, many roads were constructed as feeder or link roads in different areas. By these roads various centres were approached. Radial pattern in Oran (Banda) and Mandaura (Lalitpur) has evolved, where feeder roads survive the rural and urban lives. The construction and the growth of railway also influenced to roads of the region. For instance Karwi-Allahabad road (after 1920) has grasped the railway pattern and run parallel to it. Due to declination of river routes the commerce concentrated in the river towns was diverted to new centres and road transport achieved a bright chance for its development.

THE ALIGNMENT AND SURFACE CONDITIONS

Fig. 3.3. shows that most of the roads of region run straight as they lie in the Jalaun,

Hamirpur and Banda plains. The road tentacles of the north-west Jalaun, Rath and southern upland around Lalitpur run with tortuous curves; where the line of least resistance never runs straight. In the plain the alignments of roads are conditioned by the higher bank or the flood limits, while in the Vindhyan and Banda Plateau they always make attempt to follow the watersheds, away from the rivers. It happens such mainly because of the flat-topped nature of upland tract where river course is generally unsuitable for roads. The following two main roads will give an idea of the degree and intensity of these features within the region.

THE NATIONAL HIGHWAY 25,26:

It enters in the region near Kalpi from Kanpur running parallel to rail. Further it comes out almost in a straight line in Jalaun plain and joins Jhansi district near Risala Check-post. Going on, it appears Jhansi city through Moth, Chirgaon and Baragaon at a height of 850.5 *feet. From Jhansi it bifurcates into two directions: one to Shivpuri in the west (N.H. 25) and the other to Lalitpur in south (N.H. 26). The latitudinal profile of this road reveals that in its long run

* Height is measured from sea level.

it faces gentle gradient. Upto Jhansi district in the south it lies always in left bank of river Betwa and further gets the right Bank in Lalitpur district. It touches Madhya Pradesh near Guna through Talbehat and Lalitpur, running parallel to Betwa. The breadth is 12 feet throughout and length is 294 kms. It has contributed to railway as a feeder line and frequently is used by the private vehicles.

THE STATE HIGHWAY 44:

This is a typical road of the Bundelkhand upland which starts from Risala check-post and exists one the longest road tentacles of the region. It marches 363 Kilometres distance linking Jhansi, Allahabad cities. It can be said that it is the best road of the region. It faces several sudden steep escarpments the Vindhyan upland like between Mau and Bargarh in Banda plateau. First it crosses river Betwa and then Dhasan near Harpalpur, Keolary and Ken near Banda, Bagain and Paisuni near Karwi following sharp and winding curves. Fig. 3.3C shows that the road is well bridged and intersects the watershed-line latitudinally. It may be more significant if exceeds the number of bridges across the rivers that facilitate the movement of vehicles either in the plain or plateau. It bifurcates into

several branches as Mauranipur-Orai, Panwari- Rath, Kabrai-Hamirpur, Banda-Fatehpur and Banda-Bahraech respectively. In brief, this highway connects well the east and west cultures of the region.

THE SURFACE CONDITION:

Like other regions Bundelkhand also has the different kinds of road-pavements.

(a) Black topped, (b) Water-bound macadam, (c) Soling coat and (d) Unpaved. In 1985 there were 4085 Kilometres black topped metalled roads, 385 Kilometres water-bound-macadam roads, 607 Kilometres soling coat roads and 2049 Kilometres unpaved roads in the region under P.W.D.⁴ The metalled roads comprise national, state and district roads. The total length of the national highways is 294 Kilometres.

Besides this breadth, bridges and embankments are other important factors of road surface which singly or cumulatively affect to efficiency of traffic-flow. An enhancement of road-tentacles has no importance without bridges. Bundelkhand upland being well drained by the streams, has several big and small bridges over the Yamuna, Betwa, Dhasan, Keolary, Ken and other tributaries.

Embankments and bridges, both predominate in lowland region.

CLASSIFICATION OF ROADS:

The classification of roads is based on the only criterion of their functions and thus they are categorised as below :

- (i) The National Highway
- (ii) State Highway
- (iii) District Roads
- (iv) Village Roads

(i) NATIONAL HIGHWAY:

Being of national, strategic and administrative importance this highway traverses Jalaun, Jhansi and Lalitpur districts and serves as a inter-region link. It enters into the region near Kalpi and further bifurcates from Jhansi towards Shivpuri as N.H. 25 and Sagar as N.H. 26. The total length is as 2550 Kilometres throughout U.P. and 294 Kilometres in the region. This highway follows the course of river Betwa and the important centres like Kalpi, Orai, Moth, Jhansi, Babina, Talbehat and Lalitpur etc. have well connected each-other.

(ii) STATE HIGHWAYS:

These are such trunk roads that function as major intra-regional links. The total length is 697 Kilometres through the region. These serve as feeder to the National Highways in Jalaun and Lalitpur districts but as major highways in Hamirpur and Banda respectively.

(iii) DISTRICT ROADS:

The total length of these roads is 2917 Kilometres. Such roads are so important like the State Highways and serve as feeders connecting the marketing and producing centres of the region. These roads have been divided into two parts :-

(i) Major District roads as Banda-Manikpur and

(ii) Other district roads as Banda-Baberu-
Atarra.

(iv) VILLAGE ROADS:

These roads carry the traffic in interior rural areas. The total length is 177 Kilometres and connect villages to one-another. Being more narrow than others, these roads are feeders to district roads, state highways, railways and ferries.⁷ Some of them are metalled and some are unmetalled.

DENSITY OF ROADS

Because the region has the physical and cultural differences, the density within the region appears not one and the same. The analysis of this disparity of various roads is dealt with as below:-

TABLE - 3.1

DENSITY OF VARIOUS ROADS IN KILOMETRE* (1984-85)

DISTRICT	METALLED ROADS PER 100 KM ²				METALLED ROADS PER 100000 PERSON			
	NATIO- NAL	PROVIN- CIAL	DISTT. AGE	VILL- AGE	NATION- AL	PROVIN- CIAL	DISS.	VILLAGE
Jhansi	2.60	1.37	11.37	..	11.56	6.97	50.48	..
Jalaun	1.62	1.77	11.03	2.26	7.49	8.21	50.83	10.43
Hamirpur	..	3.12	7.78	.22	..	18.84	46.89	1.34
Banda	..	2.63	12.20	.75	..	13.08	60.72	3.77
Lalitpur	1.76	2.20	9.64	..	15.15	18.90	59.59	..
REGION	.99	2.36	9.90	. 60	5.40	12.81	53.63	3.25

The above table stresses that Jhansi and Jalaun are advanced in road density as per 100 Km² while Banda and Hamirpur fall behind. Regarding density of roads as per 100,000 persons the district Banda and Lalitpur carry the super position than others.

The distinct from the above there is a density of total roads measured as per 100 Km² area and per lac persons. Fig. 3.4 shows that district Lalitpur ranks first in both regards as 25 Kilometres of road per 100 Km² and 218 Kilometres per lac persons while the others have worse condition, that indicates the backwardness of the areas.

To examine the disparity of density, the region can be divided into seven categories, based on the length of metalled roads in relation to areas of different tahsils (Fig. 3.4B)

DENSITY OF ROADS

(Per 100 Km²)

- i) Below 8 Kilometres.
- ii) 8-10 "
- iii) 10-12 "
- iv) 12-14 "
- v) 14-16 "
- vi) 16-18 "
- vii) Above 18 Kilometres.

The first category of less than 8 kilometres per 100 sq. Kilometres covers the Charkhari and Kulpahar tahsils, which are served by

road tentacles. The second category of 8-10 kilometres per 100 sq. kilometres extends mostly over the Banda plain and plateau, Rath and Mahroni tahsils, where the dendritic and rib patterns of roads are existed. The third category of 10-12 kilometers of metalled road per 100 sq. kilometres stretches over the southern upland of Talbehat tahsil. The fourth category of 12-14 kilometres per 100 sq. kilometres overlaps on Lalitpur, Moth, Maudaha, Mahoba and Naraini tahsils. The fifth category of 14-16 kilometres per 100 sq. kilometres occupies an enhanced area of Jalaun, Kalpi, Hamirpur and Banda tahsils following the radial and dendritic patterns of road. The sixth category of 16-18 kilometres per 100 sq. kilometres covers the area of Konch and Mauranipur tahsils. Generally, these are the areas of comparatively greater feasibility of road construction. The last category of above 18 kilometres of road per 100 sq. kilometres covers Orai, Garautha and Jhansi tahsils. These are the areas where radial and lattice roads are intermixed, resulting the greater mileage of metalled roads within a limited area.

The inset figure 3.4 gives the two pictures of population density of roads based on the total length of metalled roads in relation to the

population of tahsils. In this map there is shown a group of five categories of road density. The first and low category of below 50 kilometres of metalled road per lac persons is found in Jhansi, Kulpahar and Baberu tahsils. In these areas the ratio of population is higher than road-length. The last and highest density of above 125 kilometres per lac persons is thrust on Garauth tahsil. It means that Garauth is well connected with the trade centres and thus has higher feasibility.

INCIDENCE OF POPULATION

It gets an actual pressure of population on roads which is the main aim of studying the road density. Obviously, it is a function of two variables viz. Length of roads and distribution of population around 8 kilometres accessible belt along a road. Fig. 3.4 has been prepared on the same principles on which the rail density maps are drawn. Considering this idea six district belts have been presented.

Pressure of Population on road (per kilometre)

- | | |
|-----------------------|----------------------------|
| (a) Very low pressure | Below 1500 persons. |
| (b) Low pressure | Between 1500-2000 persons. |
| (c) Moderate pressure | " 2000-2500 " |

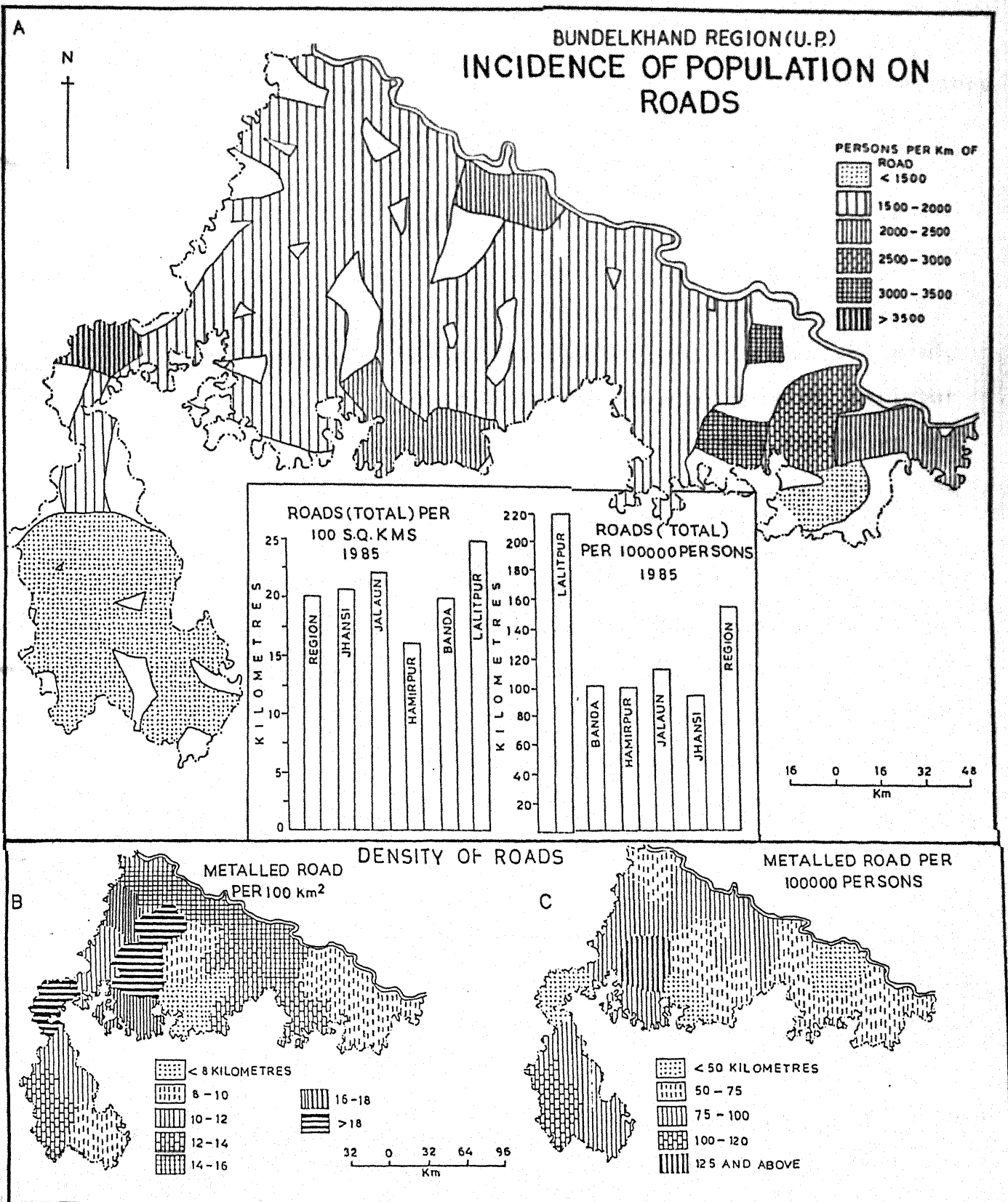


Fig-3-4

(d) High pressure	"	25000-3000 persons
(e) Moderately High pressure.	"	3000-3500 "
(f) Very High Pressure		Above 3500 persons.

Fig. 3.4A obviously represents very low pressure below 1500 persons per kilometre of road, which is found in the thinly peopled Lalitpur upland along Lalitpur-Sagar and other tentacles and Banda plateau along the Karwi-Manikpur road. The second category of 1500-2000 persons is stretched over the vast areas of the region, mainly Bundelkhand low land and transitional belt comprising ravine land along the Yamuna in the north and very small part of Lalitpur in the south. The third category of moderate pressure of 2000-2500 persons is found around Karwi-Allahabad, Mahoba-Panwari and Kalpi-Hamirpur road tentacles. The fourth category of 2500-3000 persons covers only Karwi-Rajapur road; being interior and lacking the other competitive roads. Here, the population density of metalled roads is lower as below 50 kilometres per lac persons. The fifth category of 3000-3500 persons per kilometre of road happens around Banda and Atarra-Karwi. These areas have lower population density also, but the pressure of population increases mainly because of the nodal centres urbanisation of areas. The last category of

above 3500 persons per km. dominates only around Jhansi, owing to being trade and nodal centre as well as big city within the region, although it has low population density of metalled road.

THE NAVIGATION

In Bundelkhand the Yamuna river is only navigable all over the season while the others have no such a conditions, because most of them in dry and cold weather dry up. In any case all supplies are tapped and used for irrigation on a limited scale as on the Betwa at Parichha and Dukwan, on the Ken at Gangao and Bariyarpur. The Betwa is one having the highest catchment area of 21222 Km² of the streams.

Although rail or road planning is preliminarised on water transport because cost is small in that of rail or road. The major argument on behalf of developing water ways is that they afford cheaper transportation than that can be provided by rail-roads. The reduction of transportation costs to a minimum is socially desired.⁷ But the water transport in the navigable river Yamuna is shrunked because:

- (i) There is a lack of mechanisation and the wind is not always favourable for water-transport.
- (ii) Cheaper technical proportion, once time bulky material is onwarded to banks of demands.
- (iii) Country-boat has either no deck or at most a rudimentary one with the result that the cargo is likely to be spoiled up liable to be thoroughly soaked by rain-water as well as by the river water which percolates freely through the loosely built hull.
- (iv) Changing courses, braided channels, shallows etc. are other obstructions which produce the shifting nature river-beds.
- (v) An arising development of railways also affected the water-ways to be declined.
- (vi) The maintenance of ferries is in very poor condition. These are controlled by the Zila Parishad, or private contractors or land-holders. So the true utilization and well managing conditions cannot be achieved in such cases.

There are some important ferries which provide river navigation to the people. The Bhorna

ferry on Betwa (District Jhansi) started in 1924.⁸ The two diagrams (inset fig. 1.3 B) points out an idea of loading capacity of Boats and length of rivers. District Hamirpur stands first in loading capacity of boats having about 20 tons weight per boat. Here the Yamuna is the longest river (280 kms.) among all the streams of the region.

There is a lack of canal navigation because of having low volume of water, lack of favourable depth and breadth and, therefore, is less useful for irrigation.

AIRWAYS AND AERO DROMES

Although the region was known "the battle field", and has historical, cultural, economical and religious importance yet no concentration was paid by the Govt. towards the air service. Only navigational aids and emergency night landing facilities exist for night air-mail service between Delhi and Nagpur. The aerodrome is located two and a half miles North-east of Lalitpur railway station and the runway is serviceable in all weathers. Khajuraho air route also passes through the region.

Chitrakut and Jhansi both are the important cultural Centres of the country and lie

on the main west-east route. Therefore, it is highly needed the air mail service for their economic growth and tourism development.

Concludingly, the above analysis of various aspects of distributional pattern, dealt with detail gives an idea to determine the efficiency of transport function that depends more on its accessibility and connectivity described as in following chapter.

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CHAPTER - 4

THE NATURE OF ACCESSIBILITY

Accessibility may be defined as a soft and well feasibility of connection between the places, or it is meant as the ease of contact related with the little friction¹. As the surface configuration of a region mostly affects its transportation, the geographer is particularly concerned with accessibility as a locational feature². If the location of one place is easily accessible, one travels towards it and saves the time and energy respectively. It is an essential part of economy of a region and upgrades its stratus. Searly has aptly remarked that it is an essential ingredient in an expanding economy.³ In brief, it is true index of socio-economic as well as cultural development of any region, by which the ranks of effectiveness of transport-network are achieved.

Accessibility is always relative. In fact, no place is absolutely inaccessible. In Jhansi region the areas beyond 8 kms. of a transport artery have been regarded to be inaccessible in terms of convenience of contact. However this shows the physical accessibility only.

Other types of accessibility are net, seasonal and relative. Net accessibility is measured as those areas, which are permanently inaccessible and seasonally accessible. Seasonal accessibility is related with the areas, are interrupted during the rains. Latter type of accessibility is relative in which the distance is measured with reference to time and cost of travel involved in the traffic flow between a regional centre and the places lying within its influence zone.

The region has no airways, hence railways and roadways are very significant here and have great functional importance for the regional development.

PHYSICAL ACCESSIBILITY

Virtually, there is no place where man cannot reach, because he always travels to satisfy his needs and purposes. In measuring the accessibility the distance is determined from roads or railway station, because travelling takes place through the roads or railway stations. In preparation of accessibility maps and showing the degree of accessibility isodrome-lines* of 4, 8 16 Kilometres are drawn along roads and railway-lines⁴. In the map of eight Kilometres,

* Isodromes are the lines which have been drawn with similar distance along roads and railway lines.

distance is regarded as accessible as it can be easily covered on foot walking from home to station. The actual distance may be influenced by the following main factors -

- (i) individual preference
- (ii) The degree of availability and cost of alternative means of transport and
- (iii) The total mileage of trips⁵ done by a man. It is clear from the following pages : -

RAIL ACCESSIBILITY

Map 4.1A reveals two main distinct characteristics of the rail accessibility, i.e. (i) the small patches of inaccessible areas in the lowlands of Banda district specially Naraini tahsil and (ii) large inaccessible patches lying in the north-west of Orai plain, North Banda plain, Southern upland of Lalitpur areas and trinagular area existing in the middle of Orai, Hamirpur and Jhansi region. The distribution of the degree of the accessibility is not same in the various regions.

Obviously, the following table gives the details of area under different category

cf rail accessibility :

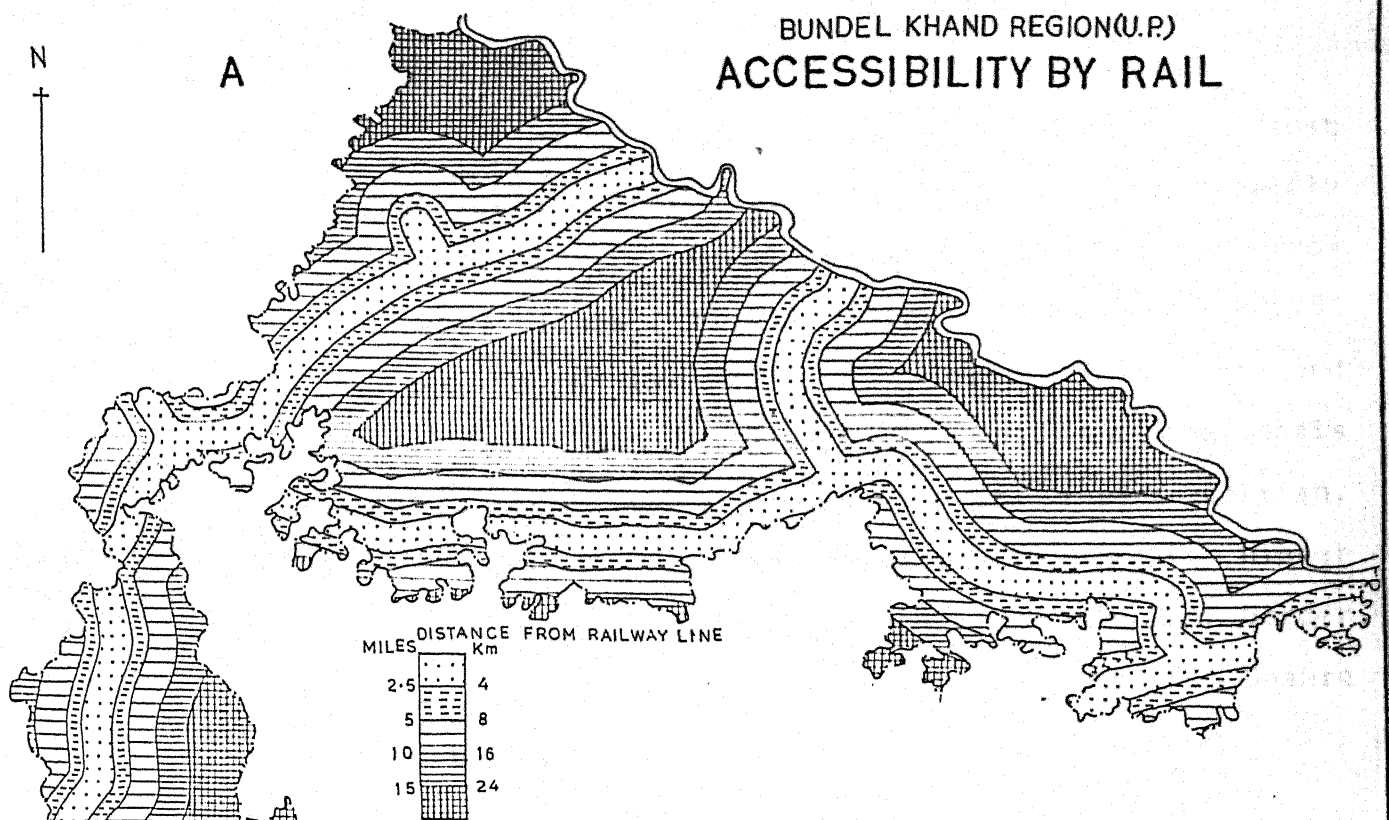
TABLE - 4.1

RAIL ACCESSIBILITY IN BUNDELKHAND REGION (U.P.)

REGION	GEOGRA- PHICAL AREA KM ²	AREA WITHIN 4 KMS FROM RLY. LINE	AREA WIT- HIN 4-8 KMS. FROM RLY. LINE	AREA WITH- IN 8-16 KMS. FROM RLY. LINE	AREA WITHIN 16-24 KMS FROM RLY. LINE	BEYOND 24 KMS. FROM RAILWAY LINE
<hr/>						
(A) <u>UP LAND REGION</u>						
(i) Lalitpur						
5042	598	575	1021	833	2015	
	(11.86%)	(11.40%)	(20.25%)	(16.52%)	(39.97%)	
(ii) Manikpur						
3170	906	711	860	474	219	
	(28.58%)	(22.43%)	(27.12%)	(14.95%)	(6.92%)	
<hr/>						
TOTAL	8212	1504	1286	1881	1307	2234
		(18.31%)	(15.66%)	(22.90%)	(15.91%)	(27.22%)
<hr/>						
(B) <u>TRANSITIONAL REGION</u>						
(iii) Jhansi						
8864	1804	1426	2392	1630	1612	
	(20.35%)	(16.08%)	(26.98%)	(18.38%)	(18.21%)	
<hr/>						
(C) <u>LOW LAND REGION</u>						
(iv) Banda						
4475	600	506	961	900	1508	
	(13.40%)	(11.30%)	(21.47%)	(20.11%)	(33.72%)	
(v) Hamirpur						
3375	481	475	733	714	952	
	(14.33%)	(14.16%)	(21.85%)	(21.28%)	(28.38%)	
<hr/>						
(vi) Orai						
4549	701	662	1248	866	1072	
	(15.41%)	(14.55%)	(27.43%)	(19.03%)	(23.58%)	
<hr/>						
TOTAL	12379	1782	1643	2942	2480	3532
		(14.39%)	(13.27%)	(23.76%)	(20.03%)	(28.55%)
<hr/>						
GRAND TOTAL	29455	5090	4355	7215	5417	7378
		(17.28%)	(14.78%)	(24.49%)	(18.39%)	(25.06%)

NOTE: Areas have been calculated by planimeter.

BUNDEL KHAND REGION(U.P) ACCESSIBILITY BY RAIL



ACCESSIBILITY BY ROAD

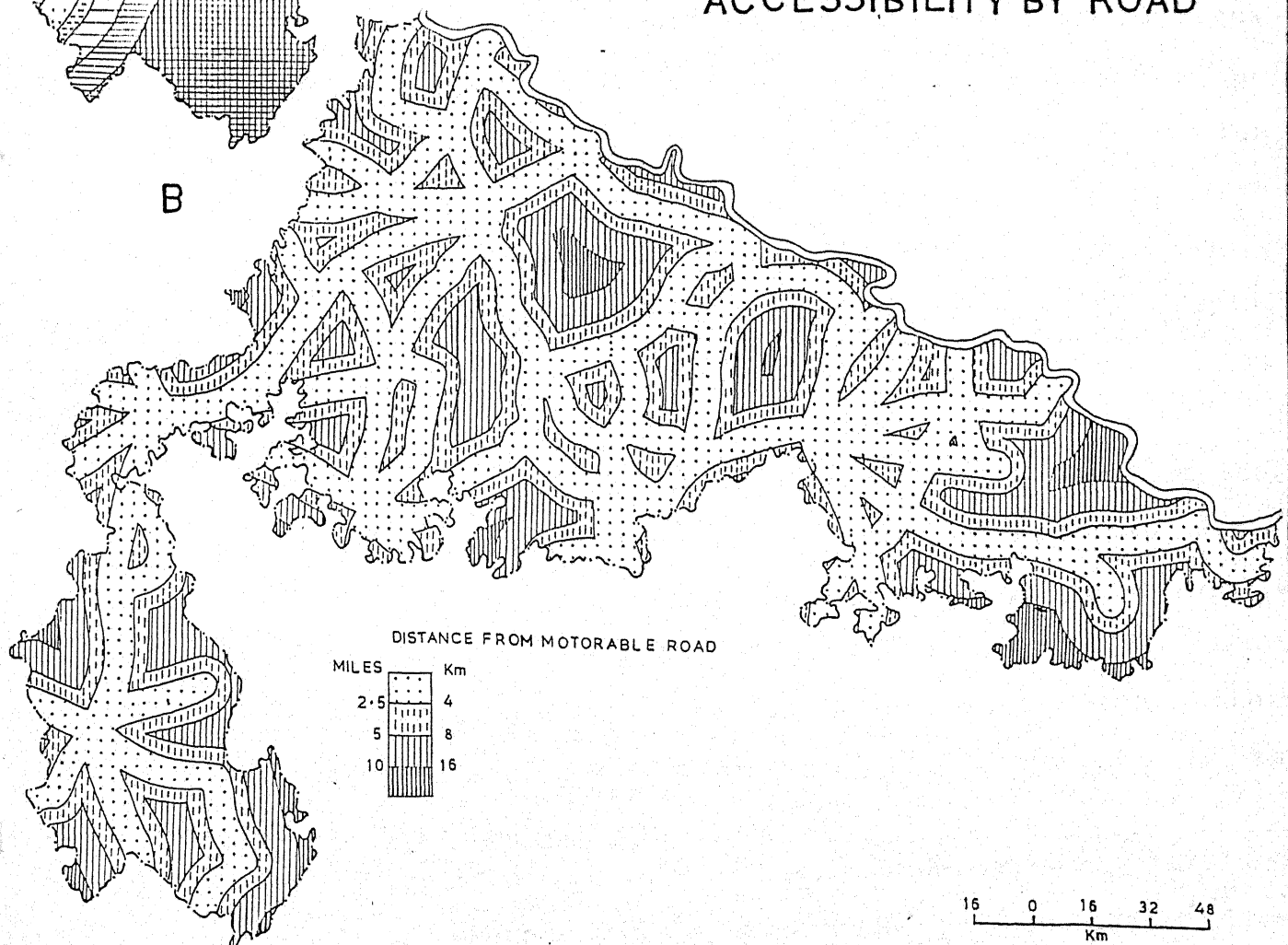


Fig-4-1

The Lalitpur sub-region is the most inaccessible part of the region, with hardly 11.86% of its total area within 4 Kms. from Railway lines, 11.40% within 4-8 kms., 20.25% within 8-16 kms., 16.52% within 16-24 kms and the rest 39.97% beyond 24 kms. on the basis of aeroisodromes*. Because of its rugged terrain, the intensity of the inaccessibility is higher in this region. Railway touches its Western border and covers small area between Matatila - Dhaura via Lalitpur.

Manikpur, sub-division covers an area of about 3170 kms., and ranks first with the highest accessibility of 28.58% in the region within 4 Kms. from railway lines. 22.43% area lies between 4-8 kms., 27.12% within 8-16 kms., 14.95% within 16-24 kms. and only 6.92% beyond 24 kms from the railway lines.

Jhansi section is the part of transitional region and lies in an area of about 8864 Km² ranking second in order of highly accessible area with 20.35% within 4 Kms., 16.08% within 4-8 Kms., 26.98% within 8-16 kms., 18.38% within 16-24 kms., and remaining 18.21% beyond 24 kms from the railway lines.

* Aeroisodromes are lines drawn on the basis of a homogeneous transport area i.e., irrespective of whether there are roads or not direct lines or as "the crow flies".

The low-land region has been divided into three units : -

- (i) Banda region covers about 4475 Km² North and South of the Bhartkup-Khairar Railway line. It is served by rail-transport with its 13.40% area within 4 Kms., 11.30% within 4-8 kms., 21.47% within ~~8-16~~ Kms. 20.11% within 16-24 kms., and 33.72% beyond 24 kms., from the railway lines. After Lalitpur division it ranks second in order of highly inaccessible area beyond 24 kms from rail-line.
- (ii) Hamirpur region enhanced in an area of approximately 3355 Km²., 14.33% of the area lies within 4 Kms. 14.16% within 4-8 kms., 21.85% ~~within 8-16 kms~~, 21.28% within 16-24% and rest 28.38% beyond 24 kms., from rail-lines. This triangular section covers total of Hamirpur, Maudaha and about half part of Rath tahsil.
- (iii) The Orai region snatches about 4549 Km² area of whole Jalaun district, 15.41% of which is within 4 kms., 14.55% within 4-8 kms., 27.43% within 8-16

kms., 19.03% within 16-24 kms., and 23.58% beyond 24 kms from the railways.

In the light of the above statement it is obvious that these three physiographic regions, viz., the upland, the transitional belt and the lowland have influenced the rail accessibility distinctly (fig. 4.1). In brief, the transitional region is more accessible by railways than others, mainly because of its more development in rail-transport and its junctions. On the whole 20.35% of the transitional region is within 4 kms., from the rail-line. In this region Jhansi is the biggest nodal centre of rail network. It is well connected with Delhi, Kanpur and Allahabad metropolises. A comparative study of the nature of accessibility of Banda (13.40%), Hamirpur (14.33%) and Orai (15.41%) discloses a sort of similarity. At last the whole region shows the rail-accessibility-categories of 17.28% within 4 kms., 14.78%, within 4-8 kms., 24.49% within 8-16 kms., 18.39% within 16-24 kms., and 25.06% beyond 24 kms., from railway line.

ROAD ACCESSIBILITY

Although the roads follow the rail-

pattern but road net work is more compact than the rail in the region. So the accessibility by road exhibits only in small patches of inaccessible areas. The following table and figure 4.1B. give a detailed picture of the nature of accessibility by road in various parts of the study region.

TABLE - 4.2
ROAD ACCESSIBILITY IN BUNDELKHAND REGION(U.P.) IN KM.²

REGION	GEOGRAPHI- CAL AREA	WITHIN 4 KMS OF ROAD	WITHIN 4-8 KMS OF ROAD.	WITHIN 8-16 KMS OF ROAD.	BEYOND 16 KMS OF ROAD
(A) <u>BANDA REGION</u>					
1. Karwi	3170	808	716	1083	563
		(22.48%)	(22.58%)	(34.17%)	(17.77%)
2. Banda	4475	2855	1092	492	36
		(63.79%)	(24.62%)	(10.79%)	(0.80%)
3. Mahoba	3079	1609	843	552	75
		(52.25%)	(27.37%)	(17.92%)	(2.46%)
4. Hamirpur	3929	1545	1061	1102	221
		(39.32%)	(27.00%)	(28.05%)	(5.63%)
TOTAL	14653	6817	3712	3229	895
		(46.52%)	(25.33%)	(22.05%)	(6.10%)

(B) JHANSI REGION

5. Orai	4549	2569	1404	561	15
		(56.51%)	(30.86%)	(12.30%)	(0.33%)
6. Jhansi	2179	1275	647	233	24
		(58.51%)	(29.68%)	(10.71%)	(1.10%)
7. Mauranipur	3032	1637	1216	161	18
		(53.99%)	(40.10%)	(5.32%)	(0.59%)
8. Lalitpur	5042	1861	1456	1501	224
		(36.91%)	(28.88%)	(29.77%)	(4.44%)
<hr/>					
TOTAL:	14802	7342	4723	2456	281
		(49.61%)	(31.91%)	(16.59%)	(1.89%)
<hr/>					
GRAND TOTAL:	29455	14159	8435	5685	1176
		(48.07%)	(28.63%)	(19.30%)	(4.00%)
<hr/>					

NOTE: Areas have been calculated by planimeter.

The table 4.2 exhibits that the Jhansi region as a whole demonstrates the highest accessibility by road i.e. 49.61% under the category of within 4 kms., 31.91% under 4-8 kms., 16.59% under 8-16 kms., and only 1.89% beyond 16 kms., from the motorable road. The high accessibility is due to the radial pattern and high density of road in this region. The region is well connected with motorable link-roads and broad highways. The Lalitpur region is less accessible (36.91%) than the Jhansi (58.51%), Orai (56.51%) and Mauranipur (53.99%)

within 4 kms., of road, due to the undulating, rugged and forested terrain.

The Banda region comes second in order of higher accessibility, 46.52% of its area stretches within 4 kms., 25.33% within 4-8 kms., 22.05% within 8-16 kms., and only 6.10% beyond 16 kms., of road. In the whole region, the Banda Sub-region as comparatively ranks the first in order of highest accessibility, 63.79% of its area lies within 4 kms., 24.62% within 4-8 kms., 10.79% between 8-16 kms., and 0.80% beyond 16 kms., of motorable road. The dendritic pattern is the main cause of road development in these areas for such a highest degree of accessibility. Imperceptible slope, interwoven road-net and nodal-point are the other important factors which affect the accessibility of this region. The Karwi division makes the biggest inaccessible patches in the whole region, because of its less motorable unbridged roads, rugged surface and rib-pattern that hardly brings 25.48% of its area within 4 kms., 22.58% within 4-8 kms., 34.17% between 8-16 kms., and 17.77% beyond 16 kms., of metalled motorable road. Between Mahoba and Hamirpur the accessibility is higher in Mahoba than latter, with 52.25% of its area within 4 kilometres, 27.37% within

4-8 kms., 17.92% within 8-16 Kms. and 2.46% beyond 16 Kms., of road, due to its dendritic pattern of road development in these areas. Hamirpur has less accessibility 39.32% of its area within 4 kilometres, 27.00% within 4-8 kilometres, 28.05% within 8-16 kilometres and 5.63% beyond 16 kilometres of road, because of its ravine land, flooded surface and less interwoven road-net.

NET ACCESSIBILITY:

It is also known as composite physical accessibility. There is a distinct pattern of accessibility, measured jointly by rail and road together with special emphasis on permanent inaccessible and seasonally accessible patches of the region. The net accessibility includes three types of areas as accessible, permanently inaccessible and seasonally accessible areas.

The following table gives an account of net accessibility in different sub-regions of Bundelkhand.

TABLE - 4.3
NET ACCESSIBILITY IN BUNDELKHAND REGION(U.P.)
AREA IN KM²

REGION	AREA	ACCESSIBLE AREAS.	PERMANENTLY INACCESSIBLE AREAS.	SEASONALLY ACCESSIBLE AREAS.
(A) <u>BANDA REGION</u>				
1. Karwi	3170	1932(60.94%)	674(21.26%)	564(17.80%)
2. Banda	4475	4090(91.39%)	230(5.14%)	155(3.47%)
3. Mahoba	3079	2404((78.07%)	235(7.63%)	440(14.30%)
4. Hamir- pur	3929	2598(66.12%)	159(4.04%)	1172(29.84%)
TOTAL	14653	11024(75.23%)	1298(8.86%)	2331(15.91%)
(B) <u>JHANSI REGION</u>				
1. Orai	4549	4028(88.54%)	310(6.81%)	211(14.65%)
2. Jhansi	2179	1906(87.47%)	119(5.46%)	154(7.07%)
3. Maura- nipur	3032	2793(92.11%)	171(5.63%)	68(2.26%)
4. Lalitpur	5042	3370(66.84%)	907(17.98%)	765(15.18%)
TOTAL:	14802	12097(81.72%)	1507(10.18%)	1198(8.10%)
GRAND TOTAL: 29455 23121((78.49%)(2805(9.92%) 3529(11.99%))				

The above table depicts that the areas of highest net-accessibility are found in Mauranipur sub-division under Jhansi Section where 5.63% area is permanently inaccessible and 2.26% is seasonally accessible (fig. 4.3A).

The highest degree of accessibility is maintained due to well rail and road connection and lattice pattern of road development.

Banda comes under second category with 91.39% accessible, 5.14% permanently inaccessible and 3.47% seasonally accessible areas.

Orai ranks third with 88.54% accessible, 6.81% permanently inaccessible and 14.65% seasonally accessible areas.

Jhansi falls in fourth category with 87.47% accessible 5.46% permanently inaccessible and 7.07% seasonally accessible areas.

The fifth category includes Mahoba region, with 78.07% accessible, 7.63% permanently inaccessible and 14.30% seasonally accessible areas.

Lalitpur comes in sixth category covering 66.84% accessible, 17.98% permanently inaccessible and 15.18% seasonally accessible areas, due to uneven, plateauous and forested surface. After Lalitpur Hamirpur region comes in succession

leading with 66.12% accessible, 4.04% permanent inaccessible and 29.84% seasonally accessible areas.

The lowest accessible area is found in Karwi region, with 60.94% accessible, 21.26% permanently inaccessible and 17.80% seasonally accessible areas. Rib-pattern of road-development, rugged terrain and private bus-routes in interior parts are the main handicaps.

In making the comparative study of Banda and Jhansi region as a whole, the latter is more accessible than the former, with 81.72% accessible, 10.18% permanent inaccessible and 8.10% seasonally accessible areas. At last the region as a whole grasps 78.49% its accessible, 9.52% permanently inaccessible and 11.99% seasonally accessible areas.

SEASONAL ACCESSIBILITY :

Figure 4.3A and the last column of the above table give the percentage of seasonal accessibility. The seasonal accessibility increases in the plain from upland to lowland Bundelkhand or south to north. The highest seasonal accessibility takes place in Hamirpur Sub-Region. There is less seasonal accessibility in the Mairanipur sub-division, where rainfall is 90.00

cms (fig. 1.4A). The inaccessible areas increase in Lalitpur, Mahoba and Karwi region of Bundelkhand upland tract owing to inaccessible by rivers and plateauous rocky-surface. In these areas only rail-net provides good transport service during the rains.

RELATIVE ACCESSIBILITY :

All the previous accessibilities are correlated with the distance from nearest metalled roads and railway lines. But there is another aspect of accessibility also and that is relative accessibility which is measured in terms of regional centres. With the help of this accessibility the extent of relation between the large and small urban centres can be known within the region. In other words relative accessibility may be considered as a relation between the centres of demand and supply, or as a series of flows of people and goods between the outlying cities and towns and the major Metropolitan regional foci in both directions⁶. Besides this, the great centres of population and transport costs are the other aspects which affect the relative accessibility⁷, have been dealt with detail with the help of three isochronic maps (4.3B, 4.2A, 4.2B) of Bundelkhand region

(U.P.). The relative accessibility has been examined by rail and road separately as well as combined in six regions of rail and eight of roads within the study region. There are two sub-regions in the R.T.C. circle Jhansi, but for the ease of study, they have been divided into eight sub-regions.

RELATIVE ACCESSIBILITY BY RAIL :

Figure 4.2A pictures the relative accessibility by rail in six regions viz., Lalitpur Manikpur (Upland), Jhansi (Transitional), Banda, Hamirpur and Orai (Low land) are mentioned earlier. Fig. 4.2A and 4.2B, 4.3B are the result of the functions of three variables viz. traffic-congestion, number of stops and directness of the routes. Although transport cost and demand also influence the relative accessibility by rail.

Fig. 4.2A gives the following characteristics of the relative accessibility by rail. (A) The highest accessibility is found around Jhansi, Manikpur and Banda, as these are nodal points. In Banda and Manikpur, because of those being the tri-junction-points, accessibility has developed nearly like a isosceles triangle with the apex at Atarra on Jhansi-

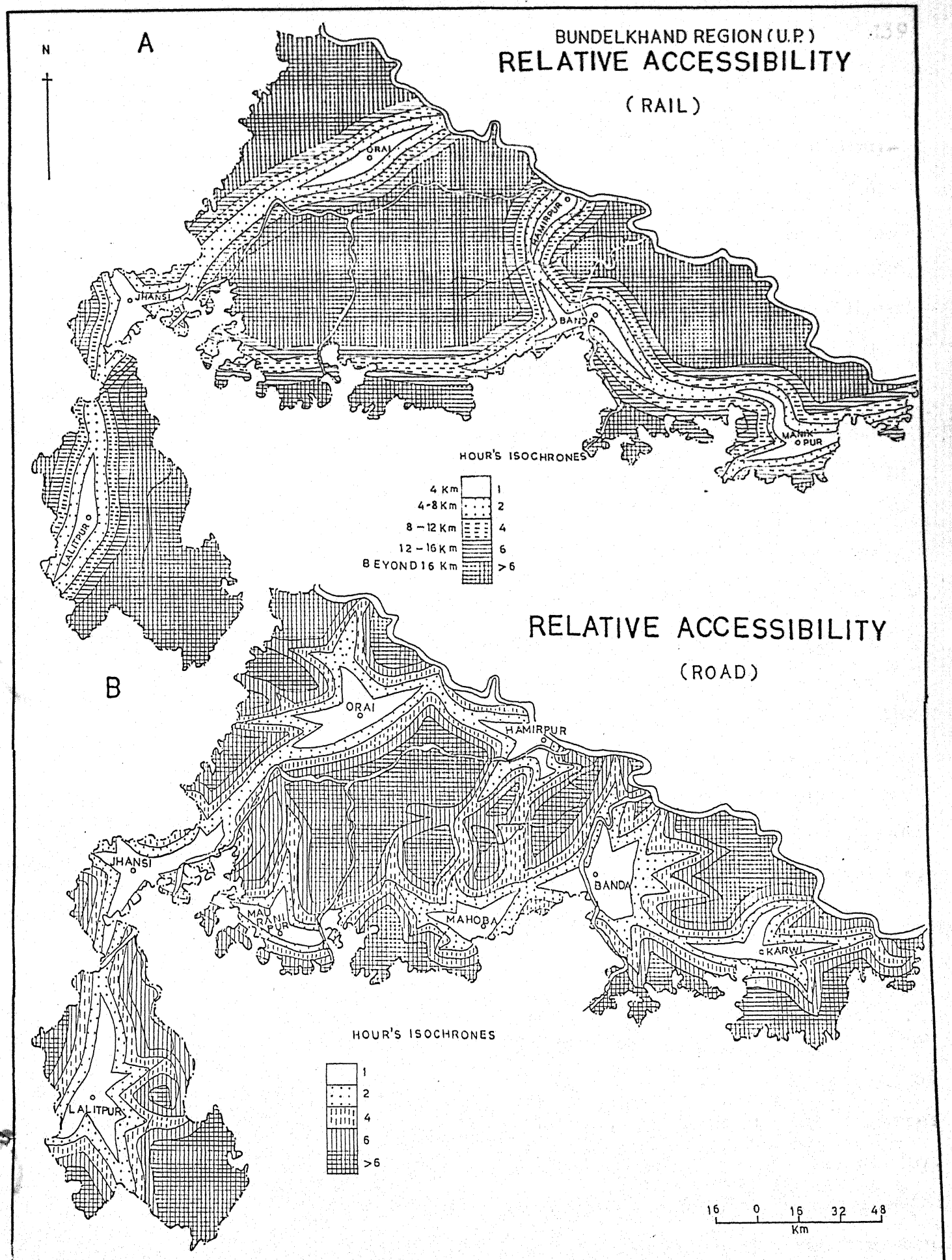


Fig-4.2

Manikpur line and at Panhai on Allahabad-Manikpur-Bombay line. Jhansi is the four junction point and therefore, shows the highest accessibility on Jhansi-Delhi, Jhansi-Kanpur, Jhansi-Manikpur and Jhansi-Bombay lines. After Orai and Lalitpur Hamirpur region represents the least accessible areas because of ravine lands in the north, river-eroded terrain in the West and the absence of any other important service centre. (B) Accessibility increases from n.e. to s.w. on Orai and Jhansi; and from West to east on Banda-Manikpur line. (c) The highest inaccessible area beyond 6 hours reach is in the middle of the region. North-West Orai plain, East Lalitpur plateau and North-East Banda plateau are the other inaccessible patches which come in succession. The very small patches of inaccessibility beyond 6 hours reach lie in the south of Bundelkhand upland tract or in southern part of Mairanipur, Mahoba, Banda and Karwi tahsils.

RELATIVE ACCESSIBILITY BY ROAD.:

From the figure 4.2B, it is clear that there is no more change in features of rail and road accessibility. About all centres carry star-shaped expansion of accessibility. Jhansi, Banda, Orai and Lalitpur have greater accessibility than the others in the region.

The patches of greater inaccessibility lying beyond 6 hours reach increase every where in equal proportion, owing to the lesser speed of bus-service, but in the mid part of region the inaccessible area increases. Besides this, the radial pattern of road at big centres like Jhansi, Orai and Lalitpur and competitive role of rail-road are the other causes which influence the relative accessibility more or less. In brief, the accessibility increases from south to north in Jhansi Region and from East to West in Banda region.

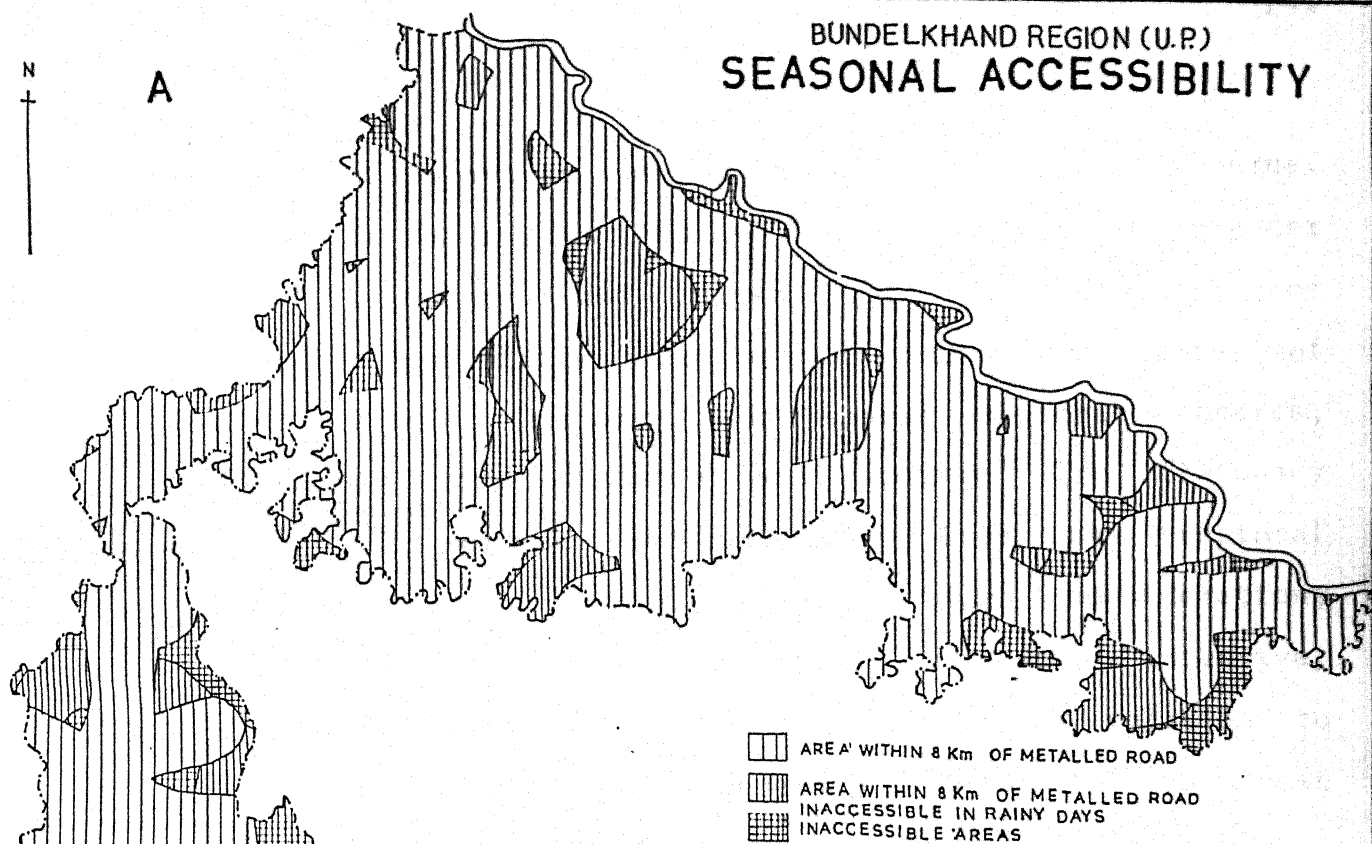
RELATIVE ACCESSIBILITY OF RAIL-ROAD COMBINED

As fig. 4.3B reveals that the rail and road are competitive for each other in Bundelkhand region (U.P.), but road is more satisfactory than rail, because it provides about door to door service. Only at Jhansi and Manikpur it is less complementary. Fig. 4.3B remarks that the areas of higher accessibility occur in the Banda, Jhansi Orai and Karwi-Manikpur regions. The accessibility increases from n.w. to south-east in Banda region and from south to n.e. in Jhansi region. There is another distinct view for determining the intensity of accessibility and it would be distance and number of frequency

BUNDELKHAND REGION (U.P.) SEASONAL ACCESSIBILITY



A



RELATIVE ACCESSIBILITY (RAIL AND ROAD)

B

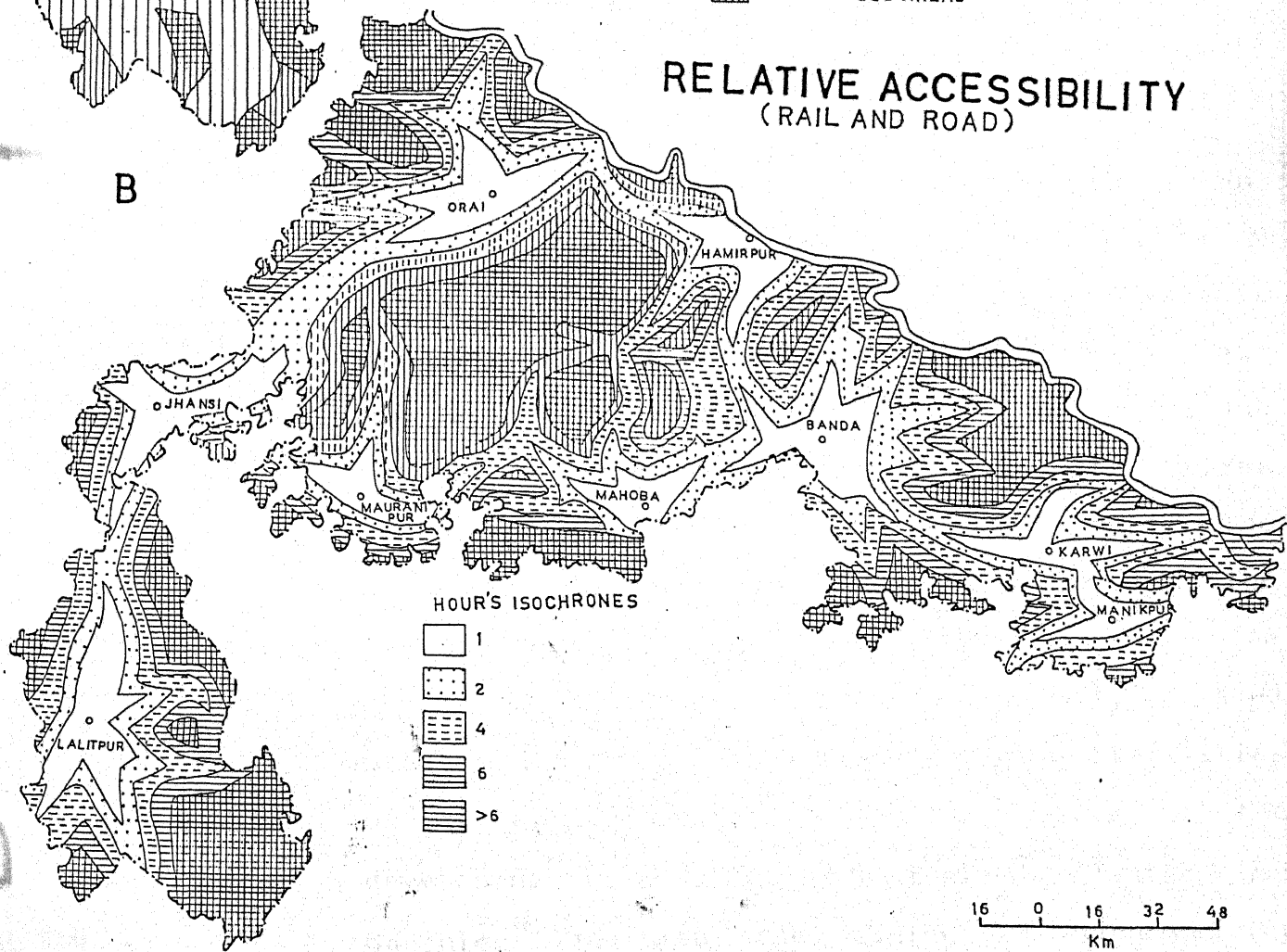


Fig-4-3

of services of the regional service centres. It is the fact that in the routes having greater frequency and close regional centres, the accessibility will be more than the routes of little frequency and sparse regional centres, or long distance and stoppage. The frequency of service reduces away from the regional service centres. Taking this consideration, the accessibility will be more intensive, which will be dealt with detail in relation to accessible and inaccessible areas in the next pages.

CONNECTIVITY :

Connectivity is an important phenomenon of any transport system. It can be seen as a series of vertices (nodes) and edges (linkages) together with the relationship connecting each edge with two vertices. Connectivity, a significant structural property of network is the degree of connection between vertices and edges. The comparison between the given networks has the most meaningful concept of connectivity. The degree of transport linkage is directly related with the demand for transportation facilities of region and hence it is indicative of the developing trend of that region⁸. Taaffe and Gauthier⁹ measured the degree of connectivity

with the help of two hypothetical network which have been applied in the case of Jhansi Division to analyse the complexity and spatial structure of transport network of the region as shown below : -

A hypothetical network shown by Fig. 4.4 indicates 7 edges and 8 nodes (minimally connected) where number of edges is always one less than the number of nodes or vertices. The relation between them may be shown as below

$$e_{\min} = (V - 1) = (8 - 1) = 7$$

Where e_{\min} = minimum number of edges, and
 v = vertices.

The removal of any edge will divide the network into two disconnected parts.

Fig. 4.4 shows the second network which has fifteen edges and eleven vertices, indicating more structural complexity than the former network. The removal of an edge here will not divide the network into two parts. With the help of the Gamma Index (Graph theory) the procedure may be analysed as under : -

THE GAMMA INDEX:-

The ratio of actual number of edges

in a network to the maximum number of edges possible in that network, is cleared by the following Gamma index : -

$$Y = \frac{\text{actual edges}}{\text{maximum edges}} = \frac{e}{e \text{ max.}}$$

Where e means edges.

Appraising that a network is abstracted as a planer graph, the additon of each node increases the maximum number of linkage therein and it is true for any planer of network of more than to vertices. Fig. 4.4A₃ clears that with the increasing of number of vertices (from three to four), the maximum number of possible edges also increases (from three to six), and thus, the equation of Gamma Index came into being : -

$$Y = \frac{e}{e \text{ max}} = \frac{e}{3(v-2)}$$

Where e means edges and v means vertices.

The variation of new work connectivity exists on a set of vetices having no inter-connections at one extreme and a set of nodes in which every node has an edge connecting it to other nodes. The Gamma Index has the numerical value as between 0 and 1 which may be revealed

for ease as a percentage of connectivity. For hypothetical minimally connected networks A and B (having 8 and 11 vertices respectively), the maximally connected networks in terms of the Gamma Index have been shown as below : -

$$\text{For A, } Y = \frac{e}{3(v-2)} = \frac{7}{3(8-2)} = \frac{7}{18} \quad 0.38 \text{ or } 38\%$$

$$\text{For B, } Y = \frac{e}{3(v-2)} = \frac{15}{3(11-2)} = \frac{15}{27} \quad 0.55 \text{ or } 55\%$$

From this numerical calculation it is obvious that in terms of maximal connectivity, the former network is 38% connected while the latter is 55% connected.

The study region has been functionally divided into six second order transport region* and shows the following degree of connectivity (fig. 4.4).

* The study region has been divided into two first order regions i.e. Jhansi and Banda on the basis of North-East South-West Regions Terrain. Both regions have further been subdivided into six second order regions on the basis of traffic circulation, degree of accessibility and traffic divide.

(A) JHANSI REGION -

(i)	Orai	$Y = 0.42$ or 42%
(ii)	Jhansi & Mauranipur	$Y = 0.30$ or 30%
(iii)	Lalitpur	$Y = 0.39$ or 39%

(B) BANDA REGION

(iv)	Banda and Karwi	$Y=0.41$ to 41%
(v)	Hamirpur	$Y=0.38$ or 38%
(vi)	Mahoba	$Y=0.39$ or 39%

The above results testify that Orai, Banda, Lalitpur and Mahoba regions are more complex than Hamirpur and Jhansi-Mauranipur regions, and comparatively are rich in trade and commerce. Orai region connecting 42% shows the highest connectivity in the whole Jhansi region. After Orai Banda-Karwi region gets the position with 41% connectivity. Each of Mahoba and Lalitpur regions is 39% connected indicating relatively less developed transport network in them. Hamirpur region comes next with 38% connectivity. Jhansi-Mauranipur region has 30% connectivity which is the least in the whole of Jhansi region. Here, the hilly terrain is main ban in development of transport arteries.

According to Haggett's¹⁰ suggestion the topo-logical measures of the structure of

network and the help of Alpha Index consisting of the ratio of the observed number of fundamental circuits to the maximum number of circuits which may exist in a newwork calculate the degree of connectivity by the following formula : -

$$D = \frac{E_n - V_n + G_n}{(2 V_n - 5)}$$

Where d is degree of connectivity

E_n is the number of edges,

V_n is the number of vertices and

G_n is the number of sub-graphs.

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CHAPTER - 5

THE NATURE OF TRAFFIC FLOW

Traffic, the core element of transport system attracts the complexities of economic interactivities. The nature and establishment of all kinds of economic activities depend on the nature of movement of things over the earth, the volume of traffic and the distance covered between the centres¹. In other words the level of economic and regional development and the factor of distance are the basic ingredients which affect the extent of traffic flow between the regions and so they are applied in a gravity model. Between the centres having the population greater, the interaction would be greater and vice-versa².

The interaction is a result of areal differentiation but differentiation alone does not account for total interchange though it does so to some extent. Interaction originates between two areas of having demand and supply. Interchange occurs only after specific complementarity is achieved which is a function of areal differentiation promoting spatial interaction³ : -

Interchange depends on complementarity only if has an intervening complementarity source of supply which is a manifestation of Stouffer's law of intervening opportunity, a fundamental loss of spatial interaction. Mahoba and Mauranipur, and Moth play their role of intervening opportunity between Banda-Jhansi and Orai-Jhansi centres respectively.

Transferability, measured in terms of displacement and cost of time, is used for the measurement of the final factor of interaction system. If there is a greater distance between the marketing and supplying areas, interaction would not succeed though have perfect complementarity and absence of intervening opportunities, and thus the transport cost upgrades between them.

In order to establish links between centres or areas, and the nature of spatial interchange, it needs some way of measuring and mapping the nature of traffic flow including the volume and speed of movement as well as its origin and destination⁴. These aspects of transportation are dealt with in the next pages clearly.

Passenger and freight are the two significant

heads of traffic handled by any transport system. As there are fundamental differences in the traffic carrying characteristics of the different modes of transport, it needs most to analyse them separately.

RAILWAY TRAFFIC

PASSENGER TRAFFIC FLOW:

Fig. 5.1A exhibits the number and heavy traffic as well as high density of passenger trains, running various railway lines in Jhansi Division which provide direct links between east-west and north-south India. In Bundelkhand there are two main lines, one connects Delhi to Bombay via Jhansi and Lalitpur and the other joins Allahabad to Bombay via Manikpur by their heavy traffic in general.

There is a minor variation in the various sections of a line in plain or plateau land. Jhansi-Kanpur via Orai, Ait-Konch, Jhansi-Banda via Harpalpur, Banda-Kanpur via Ragaul and Banda-Manikpur via Karwi are sub-lines of Jhansi Division. On Jhansi-Banda railway line the lowest traffic flow exists as fig. 5.1A shows. The heaviest traffic flow occurs along Delhi-Jhansi-Bombay railway line (over 28 UP and down trains daily).

FREQUENCY OF PASSENGER TRAINS :

Fig. 5.1B represents the number of passenger trains stopping at a station in a day within a particular time along the different section of Railway lines, by which the idea of volume of passengers and importance of that area is easily achieved. The passenger trains stopping⁵ at a station, within a certain time period, have the great importance for rail-service provided to the people particularly in case of exchanging. In preparation of frequency of trains map, a circular zone with a radius of 8 kilometres distance has been drawn around each station. This belt of 8 kilometres is most significant because it provides the maximum benefit from the frequency of service at a particular station. Fig. 5.1B represents the overlapped and non-overlapped circle zones of numerous stations. The zones of overlapping are categorised in approximate proportion to the frequency of service and various zones have come into existence. The pattern of frequency of service clearly denotes the differences within and between these zones⁶.

fig. 5.1A reveals the number of passenger-trains running on a particular line in comparison to another, but it does not mean that its all the stations carry on equality in greater privilege

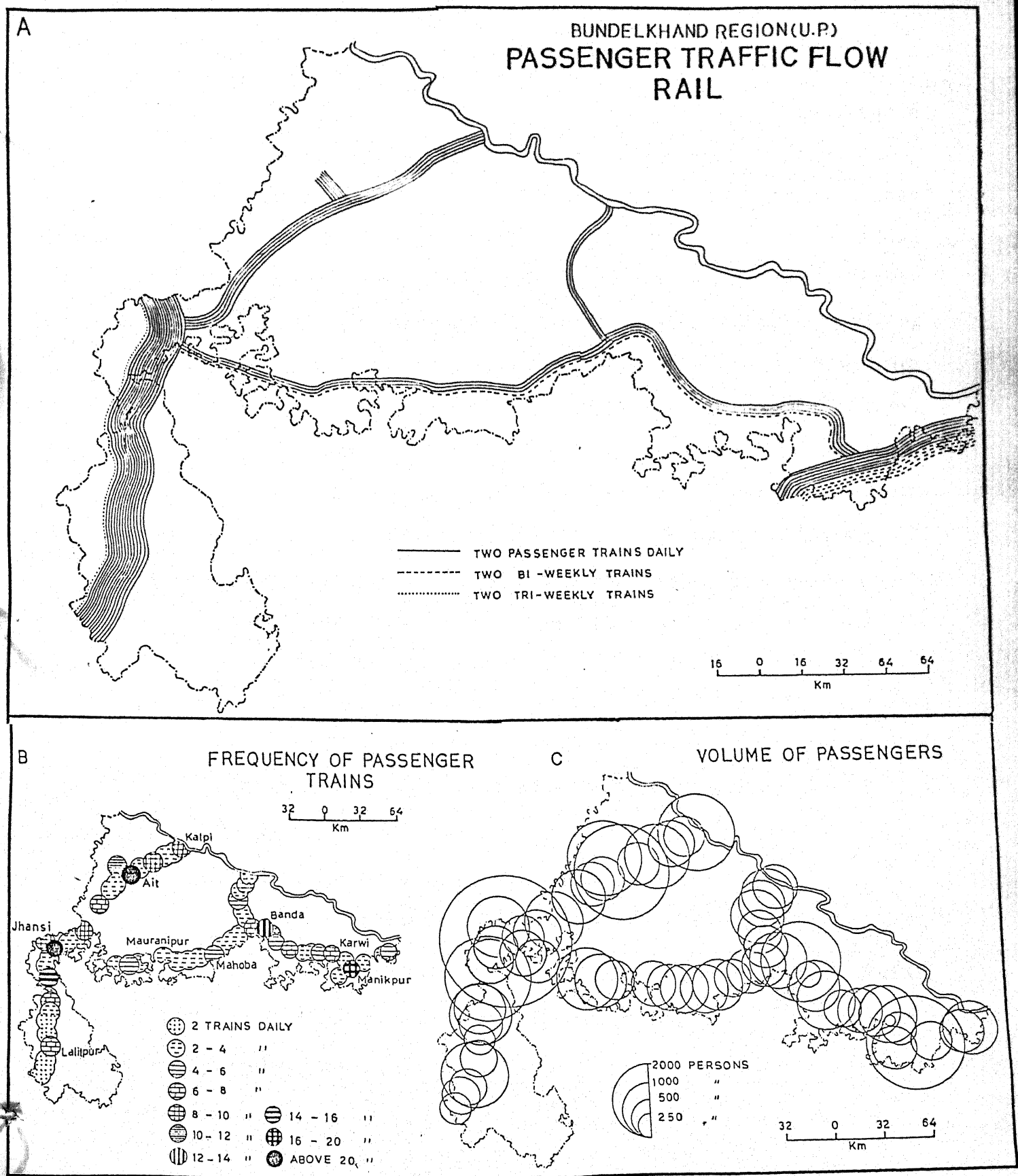


Fig. 5-1

than those having fewer trains. It's all importance depends upon the number of trains stoppages.⁷ Jhansi section of Jhansi-Delhi and Jhansi-Bombay lines has largest number of trains running along them. Actually a few stations of these railway lines have greater frequency than the others having one or two trains daily. These stations have not better service except a few up and down trains. Table 5.1 shows separately that Jhansi (48 trains), Ait (22 trains) and Manikpur (20 trains) stations have the greater frequency of trains lying in up and low and Bundelkhand tract. Of course these stations are the suitable junctions and nodal points of the region. On the othr hand Jakhaura, Dailwara, Jiron, Jakhalon and Dhaura stations in Lalitpur district carry the lowest number of frequency of two trains daily respectively.

TABLE - 5.1
STATIONWISE FREQUENCY OF TRAINS (1985).

DISTRICT	TAHSIL	STATION	NO.OF TRAINS DAILY
Jhansi	Moth	Chirgaon	10
		Moth	08
		Erich Road	04
	Mauranipur	Ranipur Road	04

		Mauranipur	06
		Rora	04
	Jhansi	Garhmau	04
		Parichha	04
		Jhansi	48
		Orchha	04
		Barwa Sagar	04
		Karari	10
		Bijauli	04
		Khajraha	04
		Babina	16
Jalaun	Konch	Konch	12
		Parauna	04
	Orai	Ait Jn.	22
		Bhua	04
		Orai	10
	Kalpi	Ata	04
		Usargaon	04
		Kalpi	10
Hamirpur	Hamirpur	Ingohta	04
		Bharwa Sumerpur	04
	Charkhari	Supa	04
	Maudaha	ichauli	04
		Akona	04
		Maudaha	06
	Mahoba	Charkhari Rd.	04
		Mahoba	06

		Kabrai	04
	Kulpahar	Kulpahar	04
		Belatal	04
		Ghutai	04
Banda	Banda	Mataundh	04
		Khairar	08
		Banda	14
		Dingwahi	04
	Naraini	Khurhand	06
		Atarra	08
		Badausa	04
		Bharatkup	04
	Karwi	Sheorampur	06
		Karwi	08
		Bahilpurwa	04
		Manikpur	20
		Panhai	04
		Markundi	04
	Mau	kataiyadandi	04
		Bargarh	06
Lalitpur	Talbehath	Matatila	04
		Talbehath	08
	Lalitpur	Bijrotha	04
		Jakhaura	02
		Dailwara	02
		Lalitpur	08
		Jiron	02

Jakhaura	02
Dhaura	02

Source: A report of Regional Manager, Central Railway, Jhansi.

Further it is obvious from Fig. 5.1B that frequency of 14-16 trains daily is found as a medium at Banda and Babina stations. Jhansi with above 22 trains is important junction point in western Bundelkhand. There is a majority of stations having only 4 trains daily. In brief, it is evident that the frequency is high on junction and nodal points and low on general stations, where ordinary passenger trains stoppages serve the local traffic. Fig. 5.1C shows the volume of passenger traffic at different stations. It clears that the frequencies are in general, in proportion to the volume. The greatest volume of passenger traffic (above 6000 persons daily) is found at Jhansi junction while the lowest at Dingwahi, Jakhaura, Dailwara and Jiron stations. However, along a Banda-Kanpur line, the volume of passenger traffic is comparatively greater in proportion to the frequency of trains obviously indicates the ill train service.

FREIGHT TRAFFIC FLOW

The freight traffic flow in the region follows the features like the passenger traffic flow. fig. 5.2 presents the rail borne freight traffic flow. Jhansi-Lalitpur and Jhansi-Delhi railway lines (with 28 goods trains daily up and down) carry the maximum cargo and record the heaviest freight traffic flow. After this, on Allahabad-Manikpur-Bombay line the freight traffic flow (with 24 goods trains daily up and down) becomes very significant. On Banda Kanpur railway line the freight traffic flow (13 goods trains daily up and down) carries a worse condition.

There are two important sharp breakers in the freight traffic from west to east at Jhansi, Manikpur centres. Former having a large number of goods trains is the main transit centre, north and south of which they get divided on the three main lines. Along the Allahabad-Manikpur-Bombay line which takes lion's share of the freight traffic latter break exists at Manikpur from where a part of the traffic is handled over to the northern railway. Khairar, Ohan and Ait are other minor break-points having minor significance of traffic.

The variations of freight traffic on

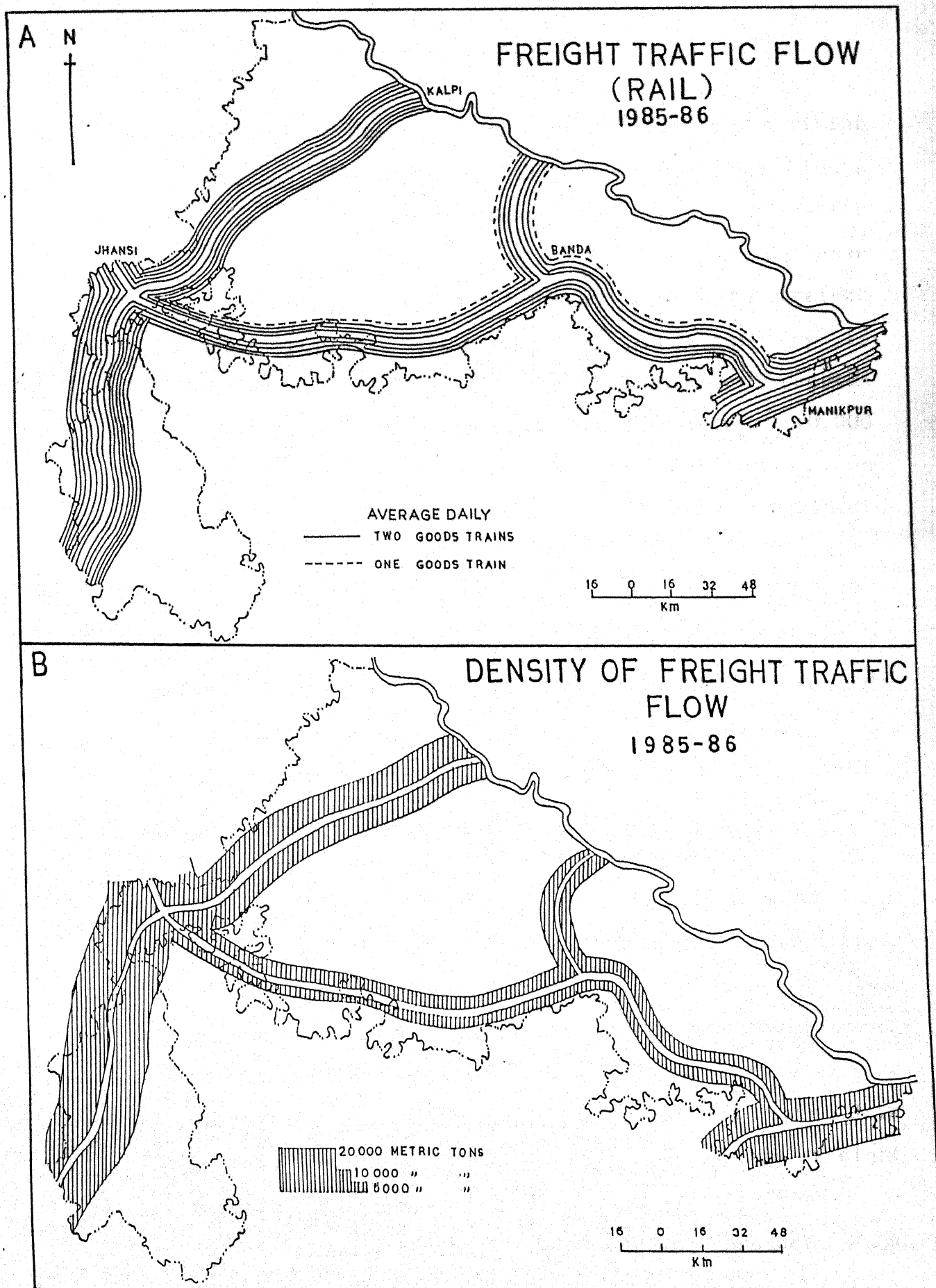


Fig.5-2

individual routes are very obvious. The most striking variation is observed in Jhansi-Lalitpur route because the rise in density of freight traffic flow is much steeper there. But a gradual decrease is visible on the Jhansi-Kanpur line. The freight traffic density on individual lines per day is almost constant e.g., on Jhansi-Gwalior section it is 28000 tons, on Jhansi-Kanpur section 20,000 tons, on Jhansi-Manikpur section 9800 tons, on Banda-Kanpur section 9000 tons and on Allahabad-Manikpur-Katni section 24,000 tons (fig. 5.2B.).

There is a great disbalance in up and down freight traffic. Generally, the trains entering the region from all sides are the loaded trains, while departing from the region often are empty.

STRUCTURE OF FREIGHT TRAFFIC

The structure of freight traffic is formed by the traffic of different commodities flowing on different railway lines. Owing to lack of data it is very difficult to analyse the present structure of various commodities, but any how with the help of useful material and some data it may be easy to be known. The total freight traffic has been divided into two heads: -

(a) Agricultural and forest product, and

(b) Origin and destination of commodities.

(a) Agricultural and forest products form the main item carried by the railways and accounts for about 40% of the total revenue earning traffic. The main items transhipped by rail are food-grains, pulses, oil seeds, sand, timber, charcoal, bidi-leaves and kerosene oil. In Jhansi Division from Jhansi junction general goods, firewood, timber, foodgrains, sand etc. are transported to new Delhi, Bombay, Kanpur, Lucknow, Satna, kalpi, Dhaulpur and Agra. In Banda region the important stations of trade and commerce are Hamirpur road, Akona, Ichauli, Mahoba, Belatal, Kulpahar, Banda, Atarra, Karwi and Manikpur. The agricultural products of the region are collected at Rath, Hamirpur, maudaha, Sumerpur, Charkhari, Panwari, Kabrai, Muskara, Kurara, Srinagar, Kherala and Kulpahar stations, from where they are exported to other regions by road or rail. Sand of late becomes one of the most important items of export from Hamirpur and exported by rail from Sumerpur railway station. About 447584 metric tons commodities are annually transhipped from Sumerpur railway station.

A deep study of volume of mercantile

commodities reveals that all the regional lines are busy in replacement of various commodities like food-grains, pulses, bones, sand, general goods, firewood, timber, oil-seeds, charcoal, military stores etc., and also terminate in out of the region. Besides this salt, cement, coal, fertiliser, general goods, petrol, steel, military stores, rail-material, sugar, jaggery, medicines, coconut, scrap etc. are imported from other regions or states of the country. The foodgrains and oilseeds originate from several stations while terminating stations are a few. Rice product is both originating and terminating from the region but it is general in practice in plain and irrigated part of the region.

ORIGIN AND DESTINATION OF TRAFFIC

It is interesting to note the origin and destination of commodities from one place to another and the routes followed by them, because it throws the focus on various important aspects of economic geography, viz., the nature of inter-regional spatial inter-action, the direction of movement and the distance of haul. This aspect gives a help in study of many problems and planning for the future transport development⁸.

From the beginning decades of twentieth century the region had developed important trading centres like Mauranipur, Kalpi, Hamirpur, Banda and Lalitpur which are dealt with the origin and destination of various commodities for the purpose of human-welfare and economic development of the region. These trading centres serve for goods, whether imported or locally made. During the thirties and early forties the trade and commerce of the region mostly hindered and declined on an account of the general economic depression, but as the result of Second World War the pace of economic recovery was accelerated and several new industries came into existence. The process continued and with the achievement of freedom, more population attracted towards trade and commerce, though agricultural commodities dominated in the markets as far as the trade of the region is concerned. On the basis of above description as well as dates and diagrams the origin and destination of commodities has been elucidated and grouped into three parts - (i) Inward-traffic, (ii) Outward-traffic and (iii) Traffic of complex movement.

(i) INWARD TRAFFIC :

Inward traffic means the movement of

those commodities which are imported from outside of the region. They are mainly sugar, cement, iron, machinery, oil, cloth, kerosene oil etc.

SUGAR :

Sugar is imported into the region at various stations in huge quantity from its neighbouring trade-blocks. Banda, Atarra, Karwi and Manikpur railway stations import sugar from Kanpur, Allahabad and Varanasi, Chirgaon from Hargaon, Meerut, Gorakhpur, Satna and Bhopal while Lalitpur from Bombay, Howrah and Nagpur, Mauranipur from Patna, Satna and Katni and Kalpi and Orai from Kanpur.

CEMENT :

Cement is another important mercantile article which is imported at Babina, Barwa-Sagar and Chirgaon railway stations from New Delhi, Kanpur and Satna, Lalitpur, Mauranipur, Moth and Talbehat from Nagpur and Satna, and Konch and Orai from Kanpur. In Hamirpur district Hamirpur road, Sumerpur, Ragaul, Ichauli and Belatal stations import about 70% of their total commodities from other parts of the country.

IRON AND MACHINERY :

Iron Steel Bars, sheets, girdle and

machinary etc., are imported from New Delhi, Kanpur and Bombay through Jhansi, Kalpi, Orai, Babina and Lalitpur stations. Banda, Atarra and Karwi are the stations which import from Kanpur and Varanasi. About 20% of the total import occurs by these commodities.

SALT :

Salt is compulsory as well as terminating article of trade. It is mainly imported from New Delhi and Bombay to western and southern stations of the region, while eastern part of the region (such as Hamirpur and Banda stations) imports from Patna and Howrah.

KEROSENE OIL :

It is supplied to region from New Delhi, Kanpur, Bhopal, Bombay and Howrah trade-blocks through the stations of Sumerpur (10% of the total import), Belatal (56% of the total import), Jhansi, Babina, Chirgaon, Lalitpur, Mauranipur and Banda (about 30% of the total import). As in the account of importance it is highly needed by all men.

CLOTH :

Banda and Hamirpur trade-blocks import the cloth from Kanpur and Varanasi through the

stations of Sumerpur, Banda, Atarra, Karwi and Manikpur, while Jhansi Kalpi, Orai, Lalitpur etc. import from Kanpur, New Delhi and Bombay. Mauranipur trade-block is famous for textile industry which supplies a huge amount of cloths to the region and country.

(ii) OUTWARD TRAFFIC :

Those commodities which are chiefly exported from the region such as foodgrains and forest-products come under this consideration.

FOODGRAINS :

As early stressed food-grains are exported from the region to various trading centres of the neighbouring regions or states. There are five trading centres which export foodgrains to other trading centres of the country only to balance the supply and demand of commodities.

TABLE - 5.2

AMOUNT OF FOODGRAINS EXPORTED FROM THE REGION (1984-85)

SL. NO.	TRADING REGION	AMOUNT (in metric tons)	IN %
1.	Jhansi	2,05,000	58.3
2.	Hamirpur	60,000	17.0
3.	Banda	50,000	14.3
4.	Lalitpur	20,000	5.6
5.	Manikpur	17,000	4.8
TOTAL		3,52,000	100

Source: Statistical Bulletin, Publishing data of various trade-blocks of U.P.

Table 5.2 clears that Bundelkhand (U.P.) is a surplus producer of grains, therefore, it exports the highest amount of foodgrains as 3,52,000 tons. Jhansi trading region includes Jhansi, Babina, Chirgaon, Mauranipur, Barwa-Sagar and Ranipur-road stations which exports the highest amount of foodgrains (58.3%) to other regions.

Hamirpur region exports to Kanpur, Lucknow and New Delhi (17.7%) while Banda region exports 14.3% of the total amount to Allahabad, Varanasi and Southern parts of the country through Banda, Khurhand, Atarra and Badausa stations. Atarra is the largest whole-sole market of rice commodity in Jhansi region. Lalitpur trading region supplies 5.6% of foodgrains to Bombay, Nagpur and New Delhi trade centres. Manikpur region shares, 17,000 metric tons (4.8% of the total) of foodgrains transported to Allahabad, Howrah, Calcutta, Jabalpur and Bombay centres.

THE FOREST PRODUCTS :

The forest product includes chiefly Biri-leaves and timber, expored to Lucknow, Agra, New-Delhi Bombay, Ujjain, Howrah and Calcutta from Jhansi, Lalitpur, Talbehat and Manikpur railway stations. The Biri industry of Manikpur

is an important cottage industry of the region which is specially based on the raw material of Tendu leaves.

(iii) TRAFFIC OF COMPLEX MOVEMENT :

Having a complexity of movement any commodity differs in intensity. For example foodgrains, general goods, cloth, and military stores are imported in huge amount and also exported in little amount.

THE FOOD-GRAINS :

These are exported to Bengal and Bihar in the east and Maharashtra, M.P., Saurashtra and Gujrat in the south and south-west. Other grain articles are transported from Banda and Hamirpur regions to Kanpur, Lucknow in the north, Allahabad and Varanasi in the east, and Agra, New Delhi in the west. In bad years these are imported from Punjab, Buland-shahar, Etawah, Saharanpur, Sitapur and Kanpur in the north and north-west. Comparatively import is approximately 2% of the export of foodgrains.

THE GENERAL GOODS :

These commodities are exported from Jhansi, Orai and Lalitpur regions and sent to

Kanpur, Lucknow, Agra, New Delhi, Jalgaon, Bhopal and Bombay. Hamirpur and Banda regions export to Allahabad, Patna and Calcutta in the east as well as to Bombay in the south. The import of general goods occurs from New Delhi, Lucknow, Kanpur, Gorakhpur, Bhopal, Gwalior, Agra, Mirzapur, Indore, Ujjain and Bombay. In this regard Chirgaon, Jhansi, Babina, Barwasagar, Erich road, Hamirpur road, Sumerpur, Akona, Mahoba, Belatal, Kulpahar, Banda and Karwi are the stations of both originating and terminating points.

CLOTH AND MILITARY STORES :

In Bundelkhand region Mauranipur is only the largest cloth emporium since British period from which handloom cloth has been exported to Ahmedabad, Calcutta and Gwalior and wool to Bhadohi and Delhi centres. Gwalior, New Delhi, Kanpur, Bombay and Varanasi are the main trading blocks. For military stores Jhansi and Babina are the main exporting stations in the region. These goods are transported to Lucknow, Agra, New Delhi, Kanpur, Howrah and Jhansi cantonment centres.

PATTERN OF RAILWAY TRAFFIC FLOW

Now on the basis of above analysis of passenger and freight traffic the pattern of rail-traffic flow can be discussed in the light of following conclusions.

Bundelkhand (U.P.) owing to its specific situations, area, surface conditions etc., has all types of traffic viz., local, originating, terminating and bridge traffic through the trunk and main lines which connect to north and south India.

All railway lines predominate in having passenger traffic flow. The pressure of passenger traffic flow is higher on the trunk and main line but freight traffic flow is very poor on the branch lines. The main lines mostly cover the terminating and bridge traffic. Originating traffic includes mainly foodgrains and forest products. About the nature of traffic flow of trade Barker remarks "the circulation of trade-traffic is as the circulation of the atmosphere or the oceanic waters. The volume and regularity depend upon the restriction or the facilities, which enumerates at any or every stage.⁸" This circulation of trade has been survived by the fundamental forces in any spatial

inter-action. Prof. Ullman put three main factors to explain the inter-action involving transportation.

- (i) Complementarity: a function of demand and supply between the regions,
- (ii) Intervening opportunity : an attraction for inter-action between two regions, and
- (iii) Transferability: measured as a value of cost and time of transport and effects of improvement in facilities¹⁰.

By these responsible factors the traffic flow of commodities is constituted. In other words the provision of transport facilities and low rate push the volume of traffic.

Within the region there is a lack of complementarity, and the pattern of rail traffic flow including passenger and goods exists from east to west and south to north-east.

Evidently, the above discussion reveals that the railnet of the region does not play a unilateral function. Therefore, according to density

and characteristics the railway lines have been classified into three categories e.g. trunk, main and branch lines (fig. 5.3B).

TRUNK LINE :

It is an important type of rail road line as Wallace remarks, "it links region railnets and connects first order of rail foci which may be ports or internal centres. Jhansi-Lalitpur-Bombay line lies in this category.

MAIN LINES :

These are secondary lines of rail-road system. Connecting the important traffic centres they radiate other branch lines. Kalpi-Jhansi via Orai and Bargarh-Markundi via Manikpur lines come under this category. These lines interconnect the towns to the trunk line and maintain the balance of traffic-flow. These are constructed in 1889.

BRANCH LINES :

On the basis of nature of traffic and functional relation with the railway reticule the branch lines have been classified as lateral, originating, terminating and balanced traffic branches. Within the region only lateral and balanced traffic branches exist. Jhansi-Manikpur and Banda-

Kanpur are the lateral branch lines which connect the two main lines viz., Jhansi-Kanpur and Allahabad-Bombay at Jhansi and Manikpur junctions. The Ait-Konch line is balanced traffic branch line where inward and outward traffic flow is almost equal.

ROAD TRAFFIC FLOW

From the above discussion it is evident that the rail-net provides the inter-region freight traffic-flow and gives a care to road transport for intra-region-traffic. The road transport distributes load from door to door and pick up and put down passengers any where.

ROAD TRAFFIC DENSITY :

There is only power-driven traffic on roads in the whole region. Figures 5.3A and 5.4 show strikingly the features of passenger and freight traffic, flow of road-transport. These are as follow : -

- (i) The heavy traffic exists around big cities and the freight traffic in comparision to the gradual rise of passenger traffic is more progressive.

BUNDELKHAND REGION (U.P.) BUS TRAFFIC FLOW

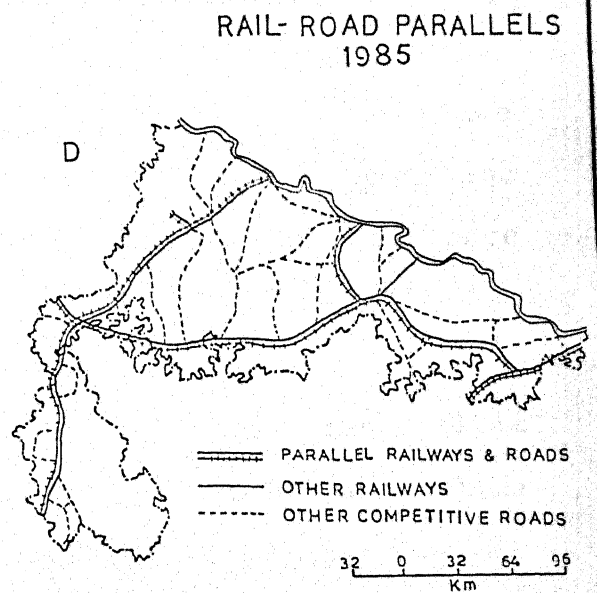
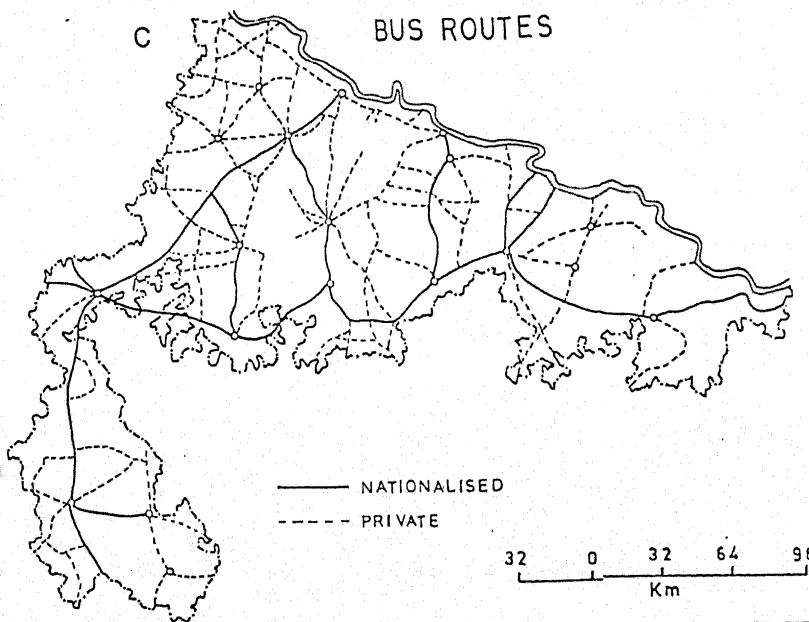
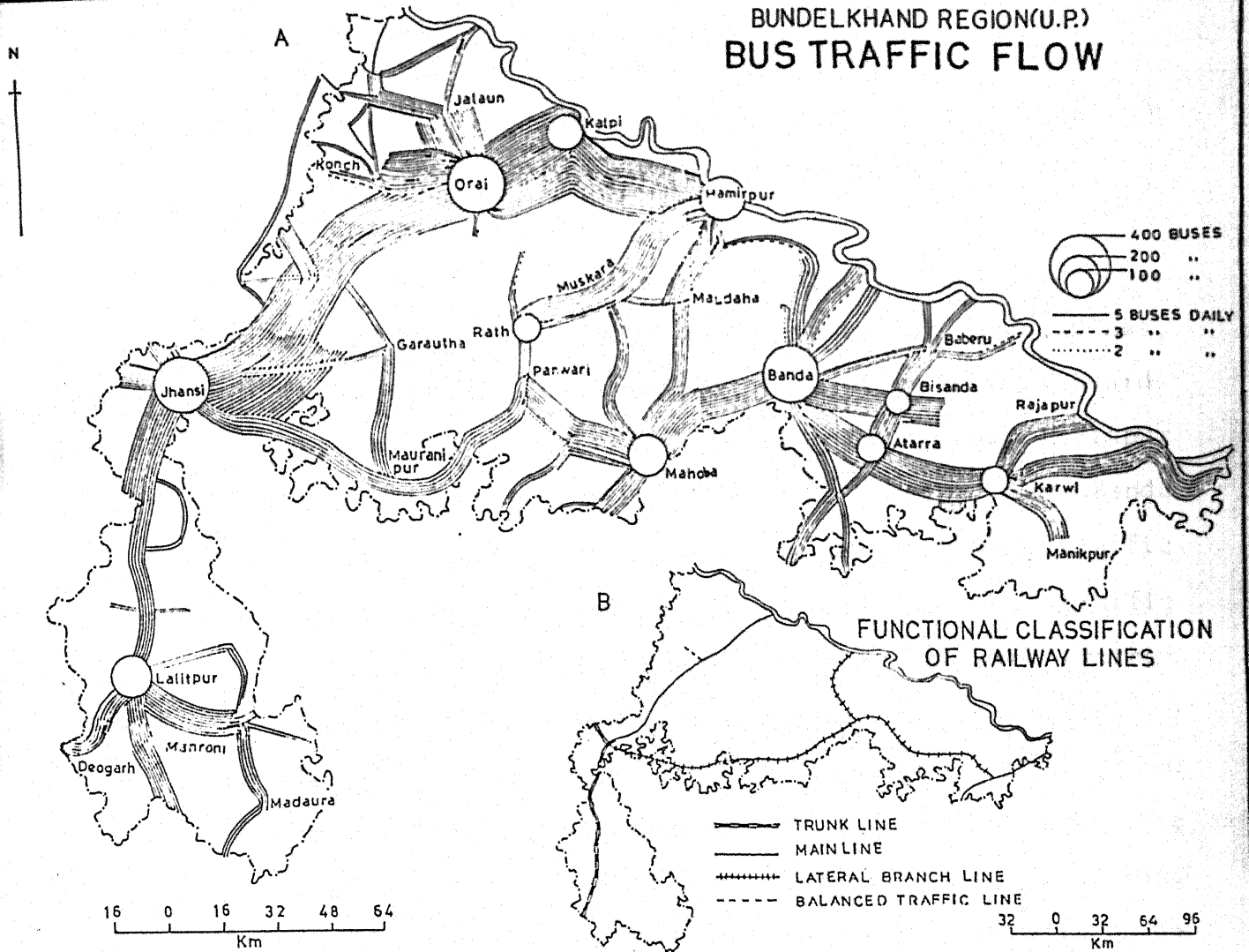


Fig. 5.3

(ii) The heavy traffic density is found on trunk roads running parallel to railways.

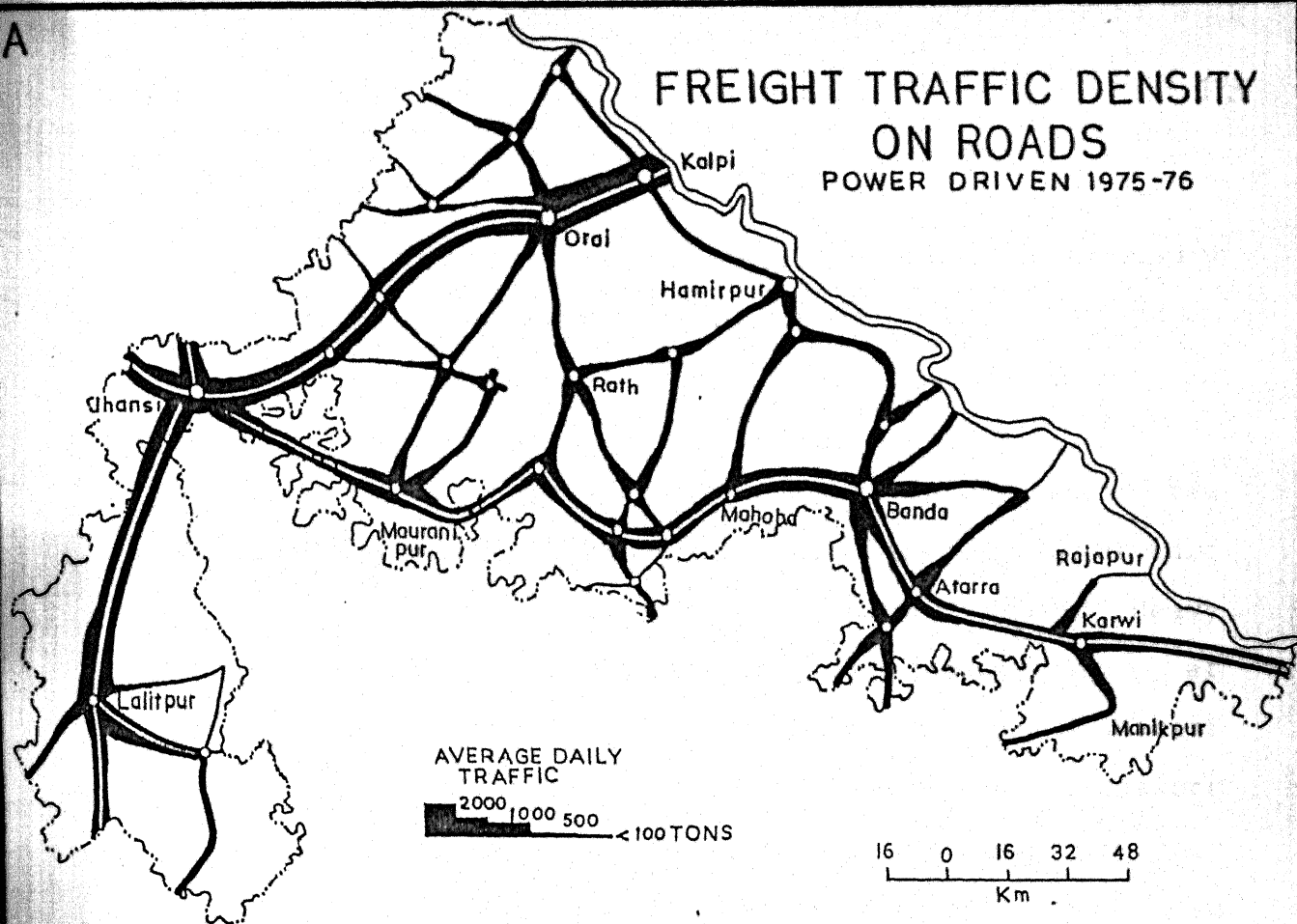
In case of former it may be said that due to the central service of cities for surroundings, the traffic from umland naturally rises towards the service centres. Jhansi, Orai and Lalitpur on the western fringe of the region and Banda and Hamirpur service centres have heaviest traffic densities (fig. 5.4). The 'col' of low traffic density between the centres of heavy density further certifies it. The traffic passing through low density 'cols' presents the bridge traffic flow between the focal centres. It is a fact that the traffic flow from these centres decreases along the distance. The other factor of discussion is that these cities are the nodal centres and tranship the traffic from road to rail and vice-versa. The traffic gathers sharply from origin place to destined area of a city for many views and denotes the importance of friction of distance and transferability.

The following factors are responsible for gravitating the traffic on main and other roads of the region.

A

FREIGHT TRAFFIC DENSITY ON ROADS

POWER DRIVEN 1975-76



B

POWER DRIVEN

1985-86

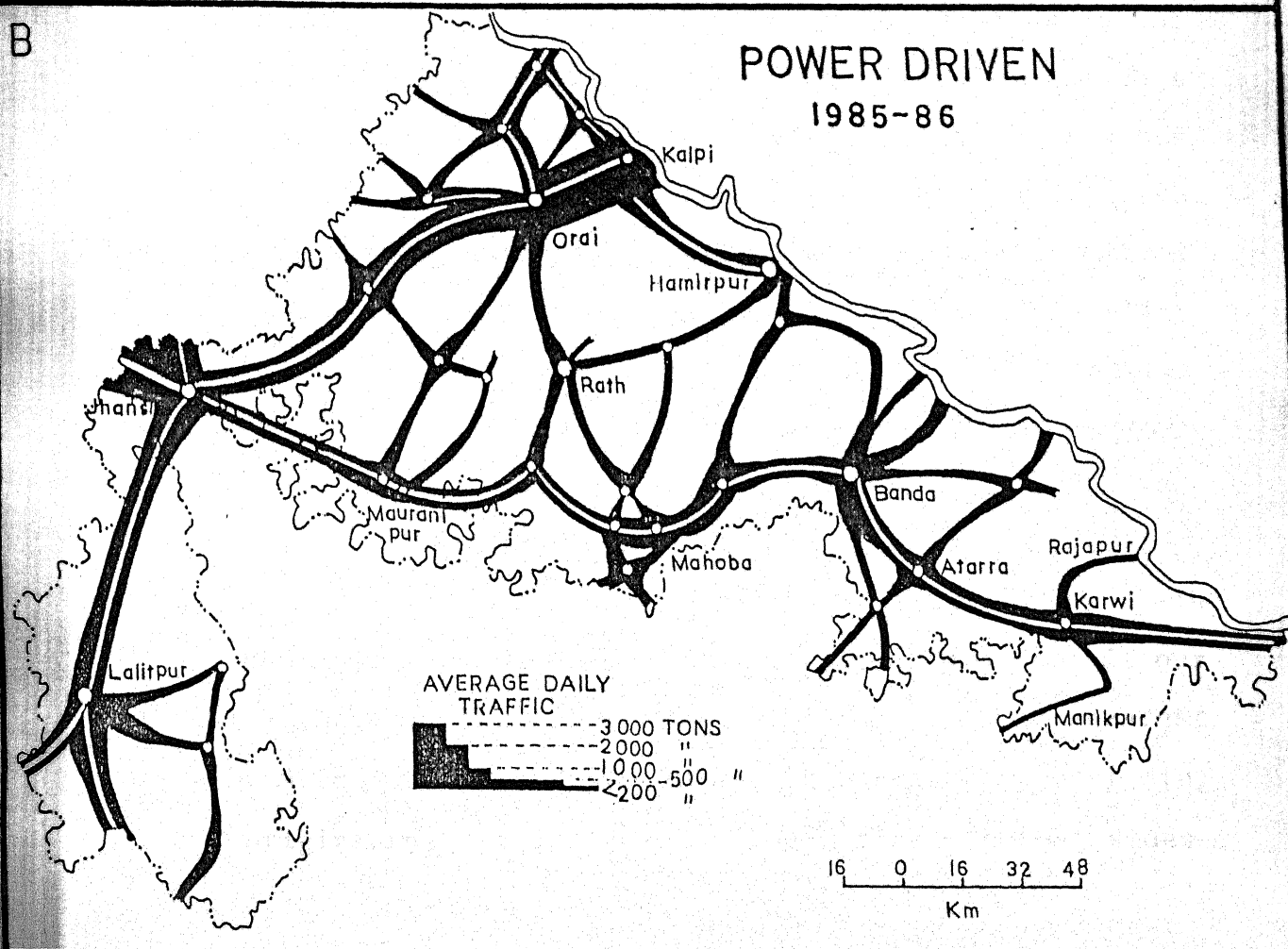


Fig. 5.4

(a) The National Highways provide inter-region link and the vehicles plying on them are quick, comfortable, frequent and cheaper in services than railways.

(b) The economy of the region with few industries of light nature is agrarian. Ayurvedic medicines and Aluminium at Jhansi, Bharat Heavy Electrical Ltd. at Khailar, hand-made-paper at Kalpi, mini-sugar at Jalaun and Hume-pipe at Karari are the main industries which prefer road transport to rail, due to its flexibility and door to door service, appearance on difficult gradient and also running on poor roads¹⁴. The traffic flow along main highways covers the great distance, so traders have greater preference for road transport. Besides this, road transport saves multiple charges such as handling and extra carting. Apart from these general views there is much regional variation in case of power-driven freight and passenger traffic, which is distinguished as given below:-

(A) ORAI-CUM-KALPI REGION :

It has the highest traffic density on the National Highways which links Orai to Kanpur and Jhansi. This is the region which has the greatest number of buses (roadways and private) including originating and destinating from both sides.

The frequency of buses is more different between the centres as Kanpur 150, Jhansi 100 Hamirpur 100, Jalaun 120 and Konch 78 daily. Private buses tranship about 17000 persons daily. The general pattern of flow is from north-east to south-west.

(B) JHANSI REGION:

Jhansi is the focal point of this region. It connects to Kanpur via Orai and Kalpi, Agra, Shivpuri and Lalitpur through National Highways and Mahoba via Mauranipur through State Highway. The total number of buses plying on the roads of this region is 350. The general pattern of flow is north-south and east-west.

(C) BANDA REGION :

It stretches over the umland of Banda, Baberu and Naraini plains. It interlinks Hamirpur, Kanpur, Mahoba and Allahabad through State Highways. From this region 282 buses originate daily. The general pattern of flow is east-west.

(D) HAMIRPUR REGION:

This region covers the vast umland of Maudaha and Hamirpur sectors. Passenger traffic is more prominent on Hamirpur-Kalpi, Hamirpur-Rath and Hamirpur-Maudaha roads, which converge

at Hamirpur centre. The frequency of buses is 223 and the pattern of traffic flow follows as east-west and north-south direction.

(E) MAHOBA REGION :

It comes under upland Bundelkhand plateau. Due to undulating terrain the passenger traffic is less developed than the others. From Mahoba nodal centre the roads radiate to Panwari, Srinagar, Maudaha and Banda. Buses plying on State Highways are 243 and the flow pattern is east-west.

(F) LALITPUR REGION :

It also comes under upland plateau covering an area of Lalitpur district. The volume of passenger traffic spreads towards Jhansi and Gona along National Highways while Deogarh and Mehroni along the district roads. The frequency of buses plying on various roads is 165. The freight traffic flow is prominent on National and State Highways. The general pattern of traffic flow is north-south.

For the above different density patterns of the region, the following factors are mainly responsible.

- (i) The region is so situated that it is known as 'gate way' between north and south India. Every movement from north to south or east to west crosses through this region and so the density of National Highways is high.
- (ii) The region has a backward agricultural economy because of the lack of perennial canals, unfertile land and less industrial development. So it generates intra-regional and inter-regional freight traffic.
- (iii) Generally, where the population density and industrial development is higher than the other region having low density, the density of passenger-traffic becomes more like Jhansi and Orai. The intra-regional mobility also affects the transshipment between the centres.
- (iv) The traffic density is greater in that region which has closely settled towns, such as Orai includes Orai and Kalpi towns and so the density is higher than that of the others.

- (v) The distributional pattern of roads accounts much for flow pattern. On National or State Highways where feeder roads converge, the density is higher. In the region the Jalaun Plain has radial pattern of roads, hence the density is greater while in Banda and Mahoba region having fork pattern, the density is lower.
- (vi) The better surface condition of roads and the bridges existing at required points also account much for traffic flow. Jalaun and Jhansi regions come under this consideration. But in lack of one of these, the traffic flow is more handicapped as in Banda and Hamirpur regions.

TRENDS IN THE GROWTH OF TRAFFIC AFTER FREEDOM

After freedom as the nation has got a bright chance of economic activities for its development, the volume of traffic also has considerably increased. Although owing to the dearth of data regarding to road transport the measurement of actual dimension of traffic-growth leads to much difficulty, yet this growth can

be estimated with the help of crude figures as the number of vehicles and surveys done for freight traffic volume at important road-points. The variation in rate of growth and various criterion urge to deal with this under two heads viz., (a) Passenger and (b) Freight, power driven.

Fig. 5.5 gives an information of stage carriages, available regarding the growth of both the passenger and the freight vehicles. It is apparent that between 1948-75 and 1984-85 the tremendous increase of traffic is more than what these figures reveal. That is the increased capacity of road-transport to handle passengers by its comfortable service, construction and repair of roads and the role of new bridges on the one side and increased mobility of population on the other. During 1984-85 the minor increase of stage-carriages lies as constant (Fig. 5.5B).

GROWTH OF POWER DRIVEN FREIGHT TRAFFIC

The motor-trucks were started to ply in the region since thirties, but their number was not large upto 1947. It was experienced during IInd World War (1939-45) a great shortage of wagons for transporting the goods, which led

BUNDELKHAND REGION (U.P.) VEHICLES AT A GLANCE 1985

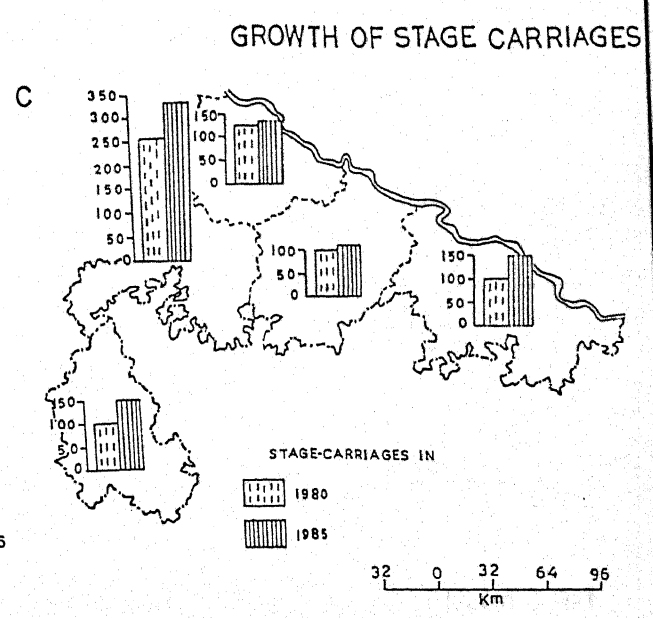
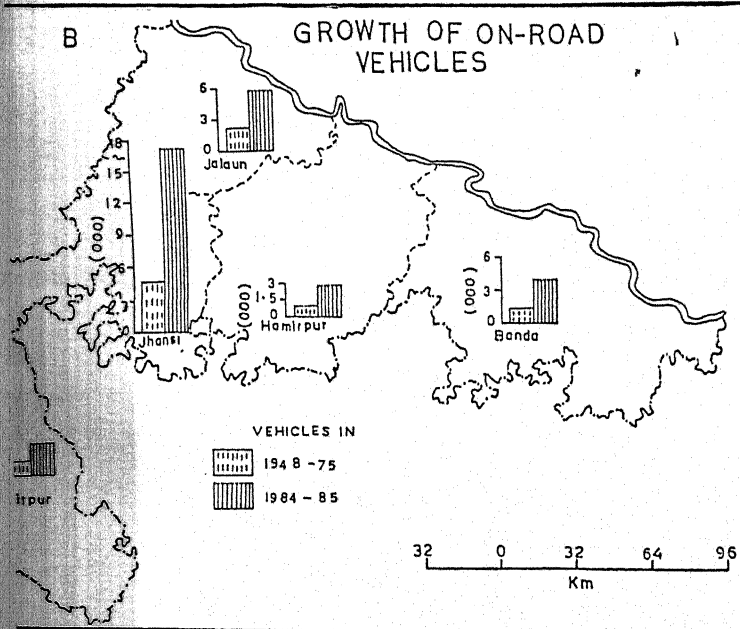
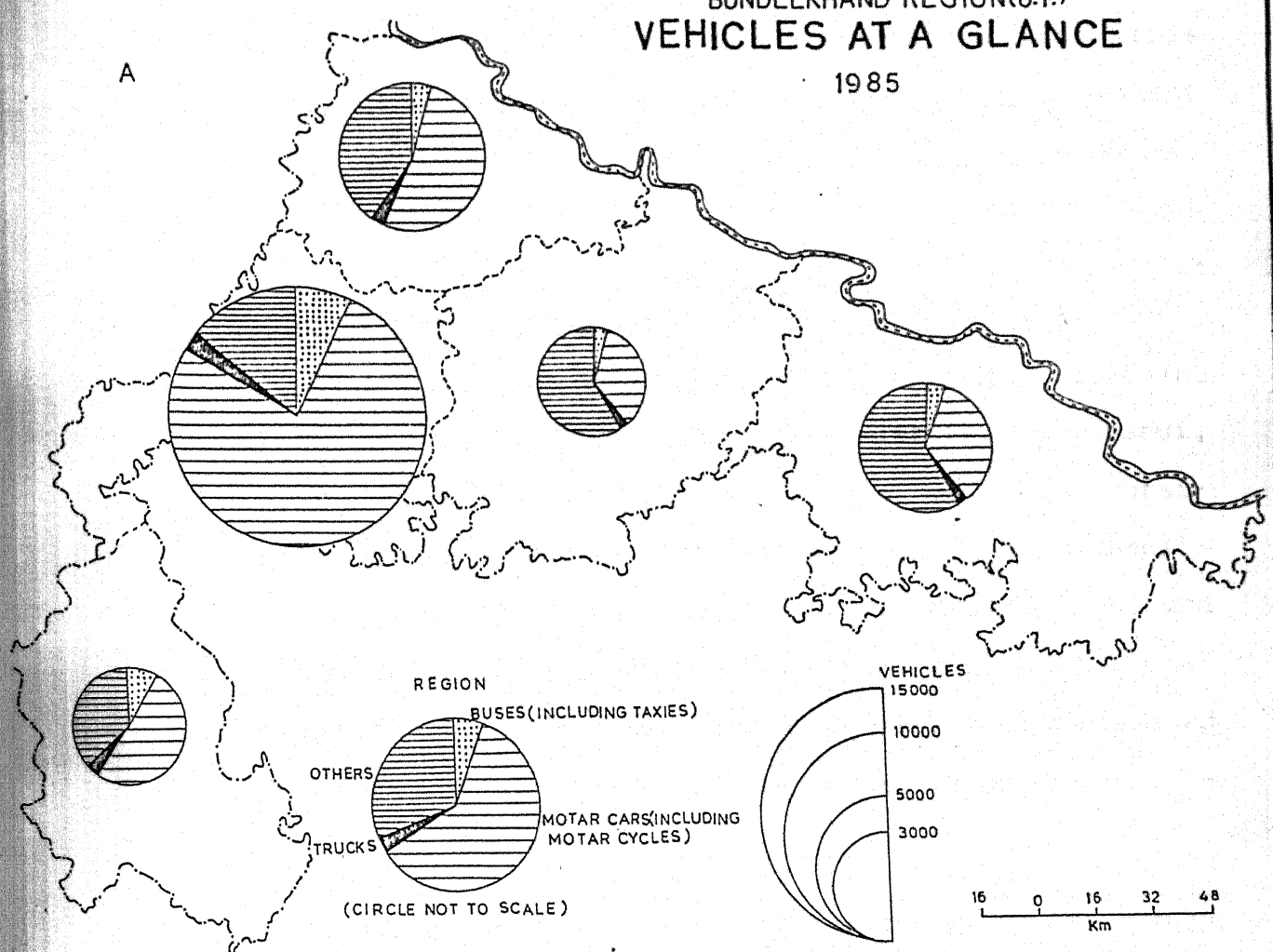


Fig-5-5

to the introduction of motor-trucks for this purpose. These are very useful and convenient for goods traffic. Their number gradually increased and now they can be seen as rushing day and night on all the main routes of the region. Fig. 5.4 shows the tremendous growth of freight-traffic density on important roads. The traffic movement is prominent around the big cities as Jhansi, Orai, Mauranipur and Banda and on the Jhansi-Shivpuri, Jhansi-Agra, Jhansi-Kanpur and Jhansi-Lalitpur road. As the volume of traffic around the towns increased tremendously, the inter-regional traffic also became prominent with the increased number of freight vehicles as is shown below: -

TRANSPORT REGION.		NO. OF TRUCKS IN 1974-75.	NO. OF TRUCKS IN 1984-85.
(a) Jhansi - (Jhansi, Jalaun & Lalitpur Districts.		598	740
(b) Banda (Banda and Hamirpur Districts		497	598.
DIVISION		1095	1338

Source: A report of R.T.O. Circle Jhansi, 1985.

It is obvious that the reflection of basic economic activities and improved condition

of road transport carry the higher traffic density. Economically more advanced the Jhansi and Orai regions have greater intra-region movements than the others and have also greater inter-regional relations. The vehicles departing from different regions i.e. Kanpur, Auraiya, Delhi and M.P.State to these parts of the region also testified the same. The Karwi (around Manikpur) and Banda (around Baberu and Naraini) are economically stagnant regions, have a little increase of traffic.

ROLE OF BRIDGES

The regional water streams play an important role for affecting the spatial interaction. in two ways i.e. the regional bonds and barriers¹⁵. For instance in prehistoric times the unbridged rivers such as the Yamuna, the Betwa, the Dhasan, the Ken etc., were a big hindrance in the movement. Thus, of the old and big bridges under the control and maintenance of the Central Railway, the oldest, which was constructed in 1884, is on the Pahuj river and is at a distance of 8 kilometres from the Jhansi railway station. Two other big bridges constructed by the Railways are on the Dhasan and the Narain. The other important railbridges, constructed on the Betwa in the west and on the Ken, Bagain and Paisuni in the east pay an important role in rail-transportation. Like

the rail, the bridges on the streams were very compulsory for the growth of road transport. It is helpful with this fact of correlation between the construction of bridges and the growth of road-traffic in the region. The construction of bridges may be seen in three phases on different perennials.

- (i) Major bridges after 1947,
- (ii) Major bridges under construction and
- (iii) Pantoon bridges (Fig. 3.3C).

Before 1947 little attention was paid to the construction of bridges. Some minor road-bridges were constructed along the Jhansi-Moth-Kalpi, Jhansi-Nowgong (1854), Lalitpur-Mehroni, Mehroni-Mandaura (1908), Jaitpur-Kulpahar, Hamirpur-Rath, Banda-Sumerpur, Hamirpur-Kalpi etc. roads. But no major bridges were constructed so far hence the road transport was crippled. After independence numerous major bridges constructed on various streams. Special mention may, however, be made of two on the Betwa, at Jhararghat (on Jhansi-Sagar road) and Naughat¹⁶ (on Jhansi-Mau-Harpalpur road). The former was opened to traffic in 1957 while the later in 1965. The other bridges appeared at Dhunkwan, Baratha, Orchha, Erich

on the Betwa, Hamirpur on the Yamuna and Betwa, Kalpi on the Yamuna, Banda on the Ken, Badausa on the Bagain and Karwi on the Paisuni. Along the Jhansi-Mauranipur-Banda, Jhansi-Shivpuri and Jhansi-Kalpi roads, the several bridges constructed on various tributaries. This resulted in massive increase in the density of traffic flow along the main Highways. An attention has been paid in the construction of National Highways on which the traffic increased manifolds after the construction of bridges. The new bridges gave a chance for many of the recent trends related with the growth of road traffic-flow.

There are some places where bridges are badly needed. The bridges if be constructed at Deogarh, Rajghat, Mata Tila on the Betwa, Kotra, Gurha on the Dhasan and Pailani (Banda) on the Ken, the traffic flow will be easy. Along the Banda-Bisanda-Pahari road the two bridges viz., at Saipur, on the Bagain and Kaheta on the Paisuni should be urgently constructed, but no construction work is going on. If these bridges be completed they will certainly provide a link between Banda and Pahari with a great density of traffic flow.

The pantoon bridges tranship the traffic (passenger and goods) towards each side of river. In fair weather season on the some important points the pantoon bridges appear at Sher Garh

(Jalaun), Chilla, Augasi, Dado and Rajapur (Banda) on the Yamuna. In rainy season they break-up their service to the people of the the region.

GENERAL CONDITION OF ROAD TRANSPORT

From the above discussion it is evident that the road transport contributes a lion's share in the regional economy. The road transport of the region commonly consists a system of both passenger and goods traffic. It is survived by the Government roadways as well as by the private operators.

U.P. GOVERNMENT ROADWAYS

Before the nationalisation of buses the contractors were monopolised in getting the licences to run their buses. Actually the tendency of contractors was to earn a lot of money without caring for the comfort of the passengers. Instead of the facilities of public they loosed the restriction of seat limit and packed the passengers into the bus like anything else-where as be possible more, because of their tendency of fetching high-money. But the road transport was nationalised in 1947 to provide facilities to the passengers, such as stoppages at certain definite wayside, halts on prescribed routes, punctuality in the arrival and departure of vehicles, fixed rates of fares and freights, avoidance of over-crowding in buses, etc.¹⁷

The U.P. Government roadways organisation was

constituted into the U.P.State Road Transport Corporation (U.P.S.R.T.C.) and started to run passenger buses since June, 1972 under Government Control routes within the region. These buses contributed a handful income to the Government as well as maximum satisfaction to the passengers. Now there are a large number of routes which are controlled by the government. Public Works Department maintains and improves the road conditions, therefore, the passenger traffic flow increases year to year. Comparatively the government bus-service is proved itself very convenient and advantageous, due to the low rate of fare, less wastage of time with other adequate facilities. In every district people travel from interior to the district or Tahsil head-quarter for various purposes. So, comparatively, the road-transport is more flexible and comfortable to the people than railways. The most important factor that greatly accelerated roadways is its punctuality and comfort rather than most convenient, frequent, timing, better organisations and facilities of waiting rooms. Buses ply on the roads with high punctuality and with without any overcrowding. Drivers and conductors move vehicles with a single passenger also, if adequate passengers

are not available for allotted seats. The speed of buses is 48 Km. per hour together with arrival and departure at every stoppage. The tickets are issued at every stoppage like the railways. After nationalisation the Govt. Roadways are working with such a zeal that by 1974-75 the total number of roadways was 56 in Hamirpur, 48 in Banda and 51 in Jhansi transport region. Now there is tremendous rise in the number of passenger and freight vehicles (fig. 5.5). During 1984-85 the Government Roadways had a fleet of 295 buses plying over 54 important routes and the number of passengers served during the year was 68.58 lacs. Jhansi, Rath, Mahoba, Hamirpur and Banda are the sub-regional depots which release the buses over the different routes of the region. For the maintenance and repairing there are two workshops in Jhansi and Banda. Orai is developed as a sub-depot in the region. In many ways the role of roadways related with the satisfying the need of passengers is more admirable and the future of road-transport in Bundelkhand region appears to be bright.

PRIVATE STAGE CARRIAGES

The private vehicles provide their

service in connecting villages with the urban centres. Generally, the roadways ply on State and Municipality metalled roads while private buses on both the metalled and unmetalled, but for short stretches they run parallel to roadways and approach the urban centres (Fig. 5.3C). There is a rule for private operators that they can not take up the passenger under the jurisdiction of Govt. roadways. But they do not care for such a type of restrictions, therefore, the economy of the Govt. Roadways decreases from time to time. The fundamental features of private stage carriages are the bad organisation, inefficiency, overcrowding, old buses and carelessness of timing. Private operators are working well for the sake of goods traffic. The private carriages ply for long distance inspite of heavy surcharges while enroute besides heavy licence fee. Because of the lack of co-operation the transport operators face a problem of ill competition among them and another trouble resulted between haulier and operator.¹⁸

RIVER TRAFFIC :

As previously stated the river transport in the region is insignificant. At the ferries of navigable river Yamuna the country-boats only are used locally to carry people and local

goods e.g. sand, hay, fruits, vegetables etc., are supplied to the far east river-side centres through Kalpi, Hamirpur, Augasi and Rajapur points.

THE NATURE OF RAIL-ROAD COMPETITION

In fact the pattern of traffic-flow about the rail and road transport is largely competitive in the region. As figure 5.3 D reveals the forms of inland transport, the rail and road are mostly parallel. Before 1947, the percentage of metalled roads was very poor. But after 1947 the road milage has greatly increased with the result of the construction of roads parallel to the railways. The motor buses also extended to the confined passenger traffic distances. In 1971 only the private buses were running all over the region, After the provincialization of road-transport the private buses scarced for running on roads as their number was 551 in 1975. During 1963 the freight traffic for movement by trucks had not developed to any appreciable extent, but now road transport involves 631 Kilometre distance parallel to railways. Simultaneously the construction of new bridges made it more efficient. At present 17.9% of the metalled roads are running side

by side to the railways in the region. Partially the national and State Highways share 7.2%, 10.7% to the total metalled roads and carry a bulky traffic, both passengers and freight despite of Govt. hard restrictions on the inter-state transshipment and heavy tax burden.

All motor vehicles are enforced to taxation under the U.P. Motor-Vehicle Taxation Act 1935, affected since 1963. Jhansi, the regional transport office collects the passenger tax, goods tax and road tax. Besides this sometime the municipalities manage for such a collection and represent a considerable addition to the tax paid by the operators. The degree of competition on various routes is not revealed due to the dearth of actual figures.

In brief, the competition is resulted by the uniformity in the nature of traffic and the flow-pattern both in rail and road.¹⁹ But the road-traffic is preferred by the public to the rail mainly because of competition in speed, reliability, care and flexibility of motor transport.

From the above discussion it is evident that the nature, flow-pattern and working intensity of both rail and road transport are distinct, but the latter is more gravitative for people specially in rural area.

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CHAPTER - 6

URBAN TRANSPORTATION

Transportation is the heart of urban lives and the urban field, because only the transport connects and breaks the correlations between field and hearts. In other words this is the area of overlap between the two fields, which are closely related for many reasons¹. Transport attempts a significant role in the location, growth, rank-size and functional differentiation of cities. In fact, it penetrates every facet of urban centres so much so that all the aspects of urban bodies can be easily prospected only by the transport-arteries. Besides this, transport plays a major role in urban-land-use and counts as one of the important functions². The contribution of transportation can be seen into two heads, viz., (a) the transport plays an important role in the location, growth; rank-size and morphology of the urban centres and (b) its patterns in various towns and morphology in the area under study.

Cities are well developed at focal or destinating points of transportation³. They

are concerned with the nodal points which possess the great attraction for the development of urban life. Nodality is disclosed as a converging point where existing routes meet out. These points have long-life, but not rather than the routes. Because trade leaves its old routes and the life blood of towns is discirculated and declined⁴ time to time and region to region.

The region furnishes well with the old and new, declined and flourishing towns. Among them Jhansi and Mauranipur on the one hand and Banda, Rajapur and Talbehat, on the other, may be cited as typical examples. Such urban centres declare the positive and negative impact of changing patterns of transport-system.

JHANSI :

Jhansi, one of the few walled cities of the State, is the biggest, eldest town of the region. Owing to its historical importance and physical relationship, it has endowed the favourable situation with focal nodality.

The town Jhansi lies on the road leading from Kanpur to Sagar about 1280 Kms from Calcutta, 1203 Kms from Bombay and 288 Kms from Lucknow. In the sixteenth century the site where Jhansi

is located was known as Balwant Nagar. It was only a small village till 1742 A.D. and after that wards Jhansi came into being of town⁵. Due to its reflective situation Jhansi was the trading and main distributing centre of the things for the other sections of the district as well as the region⁶. The development of town was banned during the first freedom struggle of 1857 and on April 4, 1858 it was occupied by the troops of the British which were stationed at Jhansi, was notified as a military cantonment in 1884. The city experienced a unique position in economic momentum and famed as a great emporium centre. Jhansi held the potential nodality, due to the advent of Central Railway in the middle of the 19th Century. The two National Highways (25 and 26 numbers) and other metalled roads converging at this town lead to Agra, Kanpur, Sagar, Shivpuri, Mauranipur etc. So, its nodality was further more strengthened. It is also clear that the growth of any town is closely concerned with the growing steps of increasing nodality.

BANDA :

Banda an another example of a developing town with increasing nodality apart from the Original condition of the site and situation.

The town closely lies on the road from Fatehpur to Nowgong about 216 Kms from Lucknow. Other metalled roads lead to Allahabad in the east, Sagar in the south, Kanpur in the north-west, Panna in the south-west and Hamirpur in the north-west. It lies on the Banda-Kanpur and Manikpur-Jhansi lines of the Central Railway. In Mughal period it was a mere village but it grew up rapidly in prominence under the Britishers in the 19th century when they made it the headquarter of the eastern part of the region. It has remained an important trading, collecting and distributing Centre of the agricultural articles due to its central location. It covers a small area of 3.29 Sq.Kms and its view from the Bamdeo hill is picturesque.

The town gradually developed and a number of new localities grew up till the freedom struggle of 1857.

The main roads are metalled but streets and lanes are dusty, dirty and crude in nature.

Before the construction of the Jhansi-Manikpur section of the Indian Midland Railway

the trade of the town ran chiefly north and south; and to a lesser degree towards the east. Two important lines of communication, one from Nowgong, and the other from Kalinjar converged at Banda. The town developed as a great centre of cotton, gram, oil-seeds, mahua flowers, ghee, hides and bones, stones, fire-wood, bamboos and cattle. it also imported wheat, rice, salt, sugar, drugs and general merchandise.

The town has also a flourishing market for the sale of non-agricultural goods like cloth and general merchandise. The trade by rail was supplemented by the large road borne traffic, especially to the north, where traders from Bindki and other doab-town purchased local produces. Now the town has a unique nodality, because the metalled roads converge at this town from all sides.

MAURANIPUR :

Mauranipur is an another typical example of more developing town because of its favourable nodality. It lies at a distance of 63 kms from Jhansi city on the Jhansi-Nowgong road. By the road, it is well connected with Gursarai in the north, Tikamgarh in the south and Mahoba in the

east. Mau & Ranipur is one of the twin towns of Uttar Pradesh. Till the latter part of the eighteenth century the town was a small village. About 1816 it was plundered by the Pindaries and again suffered during the upheaval of 1857 at the hands of the Orchha troops and recalcitrant bands from Hamirpur. It was at that time the largest town in the district. It was constituted a municipality in combination with Ranipur in 1869 and in 1912 Ranipur was separated but the town has continued to be called Mauranipur. From beginning it was famous for trade and commerce. During the reign of Raghunath Rao Hari, Subedar of Jhansi, the merchants of Chhatarpur fled to Mau. Jains form an important community in the town, and are mostly traders. Mau is a large trading centre and its merchants and bankers are said to have had correspondents in Amraoti, Mirzapur, Nagpur, Indore, Farrukhabad, Hathras, Kalpi and Kanpur⁷.

The town Mauranipur was largest emporium during the reign of Britishers⁸. The second world war sustained its commerce and industries so the town was accelerated towards the cottage-industries.

It has a unique geographical situation. The river Sukhai flows between Mau and Ranipur towns. The well known railway station of Mauranipur lies under the Jhansi-Manikpur section of the Central Railway. It is entirely dependent on the means of transport for its industry and commerce. It is virtually an industrial town and noted for the manufacture of Khadi, footwear, baskets and agricultural implements and has a considerable trade in agricultural produces, the imports being chiefly rice, sugar, salt, piece-goods and tobacco.

RAJAPUR :

Rajapur furnishes a unique example in the region, which is located on the right bank of Yamuna about 88 kms. away from Banda and 32 kms from Chitrakutdham, Karwi. In march of time the importance of converging routes decreased. The place was once one of the largest commercial markets of Bundelkhand specially for cotton and stone. A considerable volume of trade and traffic continued to find its way to doab by the overland routes and by boats to Allahabad, Mirzapur and Patna. Boats taking the pouring produce, chiefly consisting of transit goods such as grains other than wheat, oil and oil-seeds,

ghee, hides and bones, fire-wood, Mahua-flowr, cattle and timber was led to Allahabad, Mirzapur and returned with the goods chiefly of wheat, rice, salt and unrefined sugar. But the importance of water-transport declined considerably by the development of land transport. The modern highways have challenged the supremacy of that trade which till then had been caried by boats. Now the town has been facing hard to reshuffle its functional structure in the light of new transport arteries.

TALBEHAT :

Out of the numerous towns of the region, the town Talbehat maintains a typical example of flourishing set-up. It is located on the Jhansi-Sagar National Highway , away 49 Kms. from south of Jhansi and 40 kms from the Lalitpur in the Bundelkhand upland, Traditionally, this place was known as Jiriakhera and Talbehat situated on the lake, near the hill which be established by the Chandelas. It developed as the place famous for many cottage industries, such as basket-making, tanning, shoe-making and the manufacture of Persian Wheels. It is also known for its iron foundries⁹. The development of the town during the struggle period of 1857, was breaked and the transportation

disturbed in a great extent. Now the town is well connected by the Central Railway with Jhansi in the north and Lalitpur in south as well as by road with Matatila in the north-west, Nathhikhera in the east and Jakhaura in the south-west. This railway line has revolutionised the whole trade and traffic pattern of the town. The cement, salt, iron, scrap, diesel oil etc. are the important commodities which are imported from Satna and Bombay and Tendu-leaes, timber, grams etc. are exported to Agra, Gwalior, Bina, New Delhi respectively. In brief the Talbehat is urged as for its developing steps.

Abstractly, in the origin and growth of the urban organism the transport plies a much and more contribution for its live long. In other words, the process of making urban-growth, concentration, centralisation or deconcentration or decentralisation is totally depends for operating on the transport channels. And now transportation with its all development has the intermixed relation to the urban activity patterns. For this relation Rannells stressed that both are cause and both effect ¹⁰. From time to time various concepts and theories came into being that give due emphasis on the role of transportation in every process of urban growth. Mr.

Hurd¹¹ (1911) has pointed out the two typed growth viz. central and axial, the former takes place in the central place of the city while latter into outlying areas along transport-arteries. Burgess¹² (1923) represented the concentric zone theory and ranked the city into five classic zones viz. central business district (C.B.D.), transitional, independent working men's homes, residences and commuters. These zones have born with a radial expansion from the centre area of the city. In 1939, the 'Wedge Sector Theory' of Homer Hoyt¹³ came into light. This theory reveals that the general spatial structure of cities belongs the character of sectors taking the form of wedges, develop from the C.B.D. centre along transport-routes. In case of growth of cities Mr. Wehrwein¹⁴ (1942) introduced a distinct theory as discusses that the unsystematic growth of the cities results 'commercial slums' in the unland area caused by the urban land uses radiating for the centre of a city. Ullman¹⁵ and Harris presented the 'multiple - Nuclei - Theory' which reveals the fact that within the city the land-use pattern is focussed around various distinct centres. The nuclei centres of the cities are the result of the historical importance of that urban land and in affection they are strong.

From the above description it is evident that the growth of every town takes the steps along the transport arterics. If the improved route is singly connected, the growing pattern of town will be like linear, but in growing number of converging routes it will be different or some-what star-shapped. The growth with the vitality of any town totally depends not only on its internal resources but also on its capacity to survive the wide area surrounding it¹⁶. Towns, not suddenly and themselves grow up but they are urged by countrysides to do, that must be performed in Central places¹⁷. The towns in order exploit and utilize the urban land for their strength of by the means of transport. Truely, the category of existing modes of transportation determines the rank-size of towns. The hierarchy of towns adopts the growing number of converging or diverging routes. The rank-size of cities have been accounted in hierarchical order by bus services and the number of diverging routes by Green¹⁸, Seven Godlund,¹⁹ Carruthurs²⁰, Ullman²¹ and others. The twons of Jhansi Divison may also be classified in the same way. Jhansi, Banda, Mauranipur and Lalitpur etc. having greater number of diverging routes and greater amount

of traffic flow from all sides are the important towns of region. The transport system with the characteristics of topography greatly influence the morphology of the towns. The role of transport in functional variation of the city can be visualized through the lense of comparative study of distinct land use patterns with the degree of accessibility within the urban land in relation to the C.B.D. providing the central position in the city holding the higher accessibility with highest land-values. For the support, Jhansi city can be quoted in the region. Around its C.B.D. (Manik Chowk) maximum accessibility examined. Except this, the uses of land are competitively set around the centres to their ability because C.B.D. is ranked as the central place of the hierarchy of business²².

Transport plays an important role in the internal structure of the towns. It is recognised that the transportation reflects not only the extent, size and character of the city, but it facilitates the constitution of the most important different land use and functional patterns and produces other functional categories around nuclei within urban area. The functional

study of urban complex includes all those features of cultural setting which affect the most to the economic value of that city. Classification and mapping of land uses, building types, industry and commerce, density and occupational structure of the population and density of traffic flow on roads and also at nodal centres²³, communally form the frame of a city. All these factors which mould the morphology of the city should be considered that of circulation which is as the traffic of its roads and places as well as daily and hourly occurrence of activities²⁴.

THE URBAN TRANSPORT PATTERN AND PROBLEMS

So far as the nature and character of transport are concerned with several types of traffic pattern, have discussed by the scholars. It is, therefore, impossible to elaborate of all features of urban transport within the present scope of project, because the transport pattern varies from town to town and city to city.

For the convenience as well as the importance of urban field-study the Jhansi city is illustrated, chiefly in relation to its morphology and functions, to arrive at certain generalities.

JHANSI :

It is the oldest city of this region as well as the State which is situated in the west of the Bundelkhand Gneissic plateau (Lat. $25^{\circ} 27'$ and Long. $78^{\circ} 35' E$).

ROAD PATTERN :

Having the great attraction of trade and commerce, freely passage of transportation and communication is uneven in the city. But having neat and cleaned, hard and stable surface and historic importance, this place represents the great view for Indian and the others. With the facilities of all types of service centres the people clustered to the spacious land of the city. There are many short and long routes within the city which tap and sap its economic development. The main regional roads pertaining to radial pattern, bounded by the successive spreads of the city are Jhansi-Kanpur, Jhansi-Gwalior, Jhansi-Shivpuri, Jhansi-Sagar and Jhansi-Mirzapur. Within the city the local roads are about 27, but the Khanderao-Gate-Manik Chowk-Subhash Ganj-Rani Mahal-Minerva road is the most congested which follows the two roads viz., Elite-Khanderao Gate and Chitra-Commissionary-Khanderao Gate Road respectively. These roads

are interested by several transverse and diagonal roads, the important among them being Elite-Bundelkhand Degree College, Elite-Allahabad Bank Crossing-Cantonment, Allahabad Bank-crossing-Station, Natraj-Ashok Hotel-Station and Sabji Mandi-Baragaon Gate Roads. The overall pattern of roads seems like radial and cobweb.

TRAFFIC FLOW^{*}:

There are four important nodal points lying on the eastern northern, north-west and western sides of periphery of the city named as Jhokanbag, Manik-Chowk, B.K.D. and the Chitra. Besides the above nodal centres Allahabad Bank crossing in the south and Jhansi station in the west are other nodes of relatively minor importance. The traffic flowing to and from these nodes converges at Elite and Kachehri crossing (Fig. 6.1A); the latter being important for mixed traffic through Jhokanbag crossing.

Within the city the most important routes for traffic flow are : (1) Khanderao Gate-Manik Chowk-Subhash Ganj-Rani Mahal-Minarva, (ii) Elite Kachehari - Jhokanbag-Bus Stand, (iii) Elite-Chitra-Sipari, (iv) Elite Bundelkhand

* Based on the departmental traffic surveying report on 12 hours.

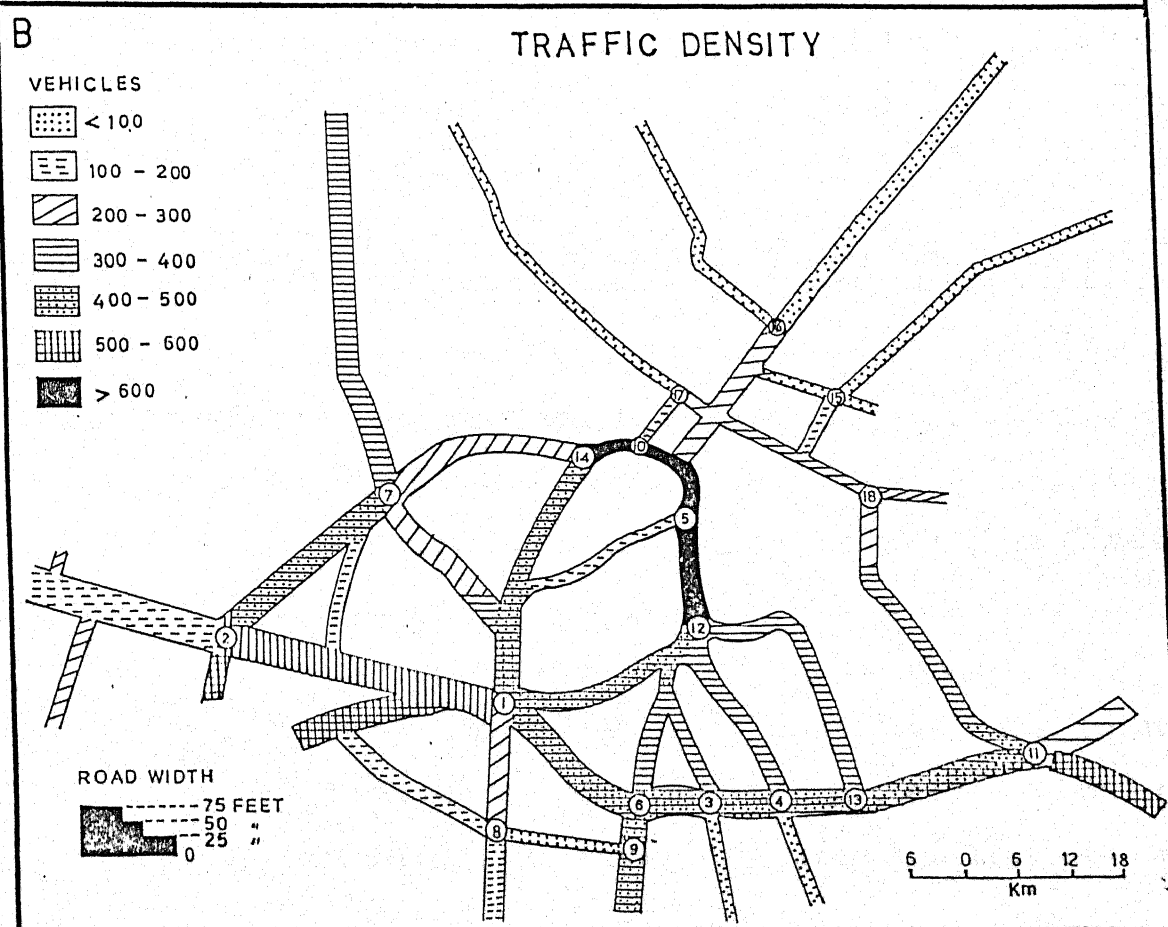
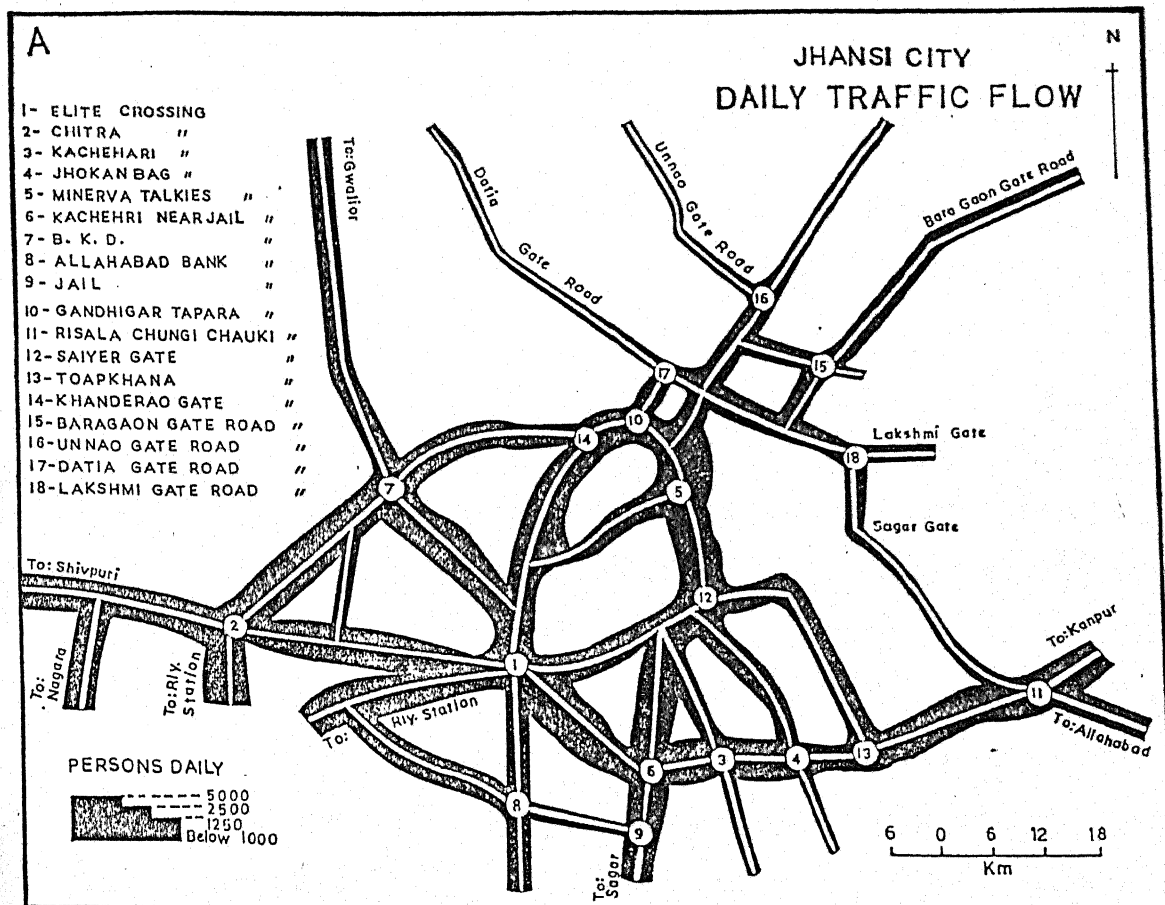


Fig. 6-1

Degree College-Polytechnique College, (v) Elite-Allahabad Bank-Jail, (vi) Elite-Khanderao Gate, (vii) Kachehari crossing Sagar Gate and (viii) The Lakshmi-Datia Gate road. The peripheral Khanderao - B.K.D.—Commissionary-Chitra road is also significant. The whole city covers the mixed category of traffic flow on overall roads. Automobiles such as two-seaters and taxies predominate within the city. It is surprising that the town as a whole furnishes with the lackness of Rickshaws, mainly because of uneven surface. Jhansi Station, Sipri-Chowk-Bazar and Kanpur Bus Stand roads concentrate the traffic of Ekka-Tonga, Bullock carts especially. Bicycles minorly run only for lessened purpose.

From the above noted features of traffic it is indicated that the correlation between the nature of traffic and the separated functional areas is totally reflected by the significant role of transportation which unfolds the internal structure of the city; the essence of which is the geographical specialisation and the functional set up of urban community. The relation and importance of landuse patterns with high valued sites in terms of accessibility is well

noted by Mr. W.L. Garrison. He remarks- "The Central Business District provides the most central location in the city, a point of maximum accessibility with the highest land-values. Urban retail business are also to pay the highest rent for sites which possess accessibility to the largest segments of the urban region. They take possession of these sites and other land-uses are arranged around them according to their ability to bid competitively for the land²⁵. Thus an orderly pattern of land use results in which sites are occupied not merely by the activity which can pay most but also by the activity which can pay most but also by the activity which receives the greatest advantage in terms of accessibility²⁶. Considering this way the retail business centres forming the Manik Chowk Central Business District in the north of the city, lie on Bara Bazar-Gandhi Gar-Tapara, Kotwali, Motor Stand and Saiyar Gate Road, where Two-seaters and cycles predominate and every shop is accessible to these wheeled vehicles of highest flexibility, but near Manik chowk the traffic is braked due to narrow routes and highly traffic flow. The whole scale business centres as Subhash Ganj Ki Galla Mandi and Sabzi Mandi have arranged near Risala-Chungi Chauki

on Kanpur route, where exist the slow moving and heavy load carrying conveyances. Between the Manik Chowk C.B.D. Centre and Civil Line Administrative Zone the Saiyar Gate-Jhokanbag-Kachehari - Jail Road predominated. The Vaidyanath Ayurved Bhawan and Katai Mill, large industries have established on Jhansi-Gwalior Road which is the artery of intercity transport. Near Antia Tal the mini industrial belt on Khanderao Gate-B.K.D. - Chitra Road set-up well. The big blank patches near cantonment north of fort and along railway in Sipari are settled as Nai Basi where the narrow lanes are frequented. Beyond the Central Business District there are some sub-centres and neighbourhood groups located along traffic arteries, but rarely down the intersecting streets and business nucleations.

In brief, the overwhelming importance of Two-seaters and Taxies is limited to the intracity movements, and on the other hand Buses, Trucks and 'Others', play a greater role in maintaining the external-relations of the city.

TRAFFIC DENSITY WITH TRANSPORT BOTTLENECKS

The traffic density has been seen into

two views, viz., intercity and intracity density in relation to road-width on all important roads of the city. Taking the 300-400 vehicles, as the mean it is obvious that in general, the heart of the city around Elite has above average density. The Khanderao-Manik Chowk-Subhash Ganj-Rani Mahal-Minerva Road leads the highest traffic density of over 700 vehicles respectively. There are local disparities depending upon the combination of the two variables; the density and the width particularly the latter. Because, the narrow width, and especially a sudden construction of width in particular localities creates acute traffic problem accentuated by the co-existence of different kinds of traffic and carelessness of the communities. The inter-city traffic-density accentuates that the pressure of 558 vehicles is existed on Jhansi-Banda, 496 vehicles on Jhansi - Lalitpur, 379 vehicles on Jhansi-Gwalior, 285 vehicles on Jhansi-Kanpur and 190 vehicles on Jhansi-Shivpuri road.* The various functional zones of the city are dependent upon free and smooth flow of traffic. The traffic bottlenecks depicted in fig. 6.1 B are also the centres of particular attention. The Lakshmi-Datia Gate is the narrowest roads where the

* The data are based on the departmental Traffic Surveying Report on 12 hours.

traffic density of 300 vehicles is found. Similar conditions exist in the Shivpuri-Nandanpura, Sipari-Chamanganj, Nanakaganj- Arya Kanya Degree College and Saiyar Gate Roads. Taking the width of the Elite-Chitra road as the standard for the average traffic density, the Elite-Khanderao Gate, Elite Bundelkhand Degree College, Elite-Natraj-Station and Chitra - Commissionerary roads can easily be counted in such zones.

TRANSPORT PROBLEMS

The town Jhansi having the unique characteristics and transport problems represents the general case of all the towns of region.

The road width, bottlenecks, insufficient foot-path, co-existence of traffic, lack of parking land and alertless mind of hawkers and vendors, unlawfully occupying parts of streets, traffic noise and atmospheric pollution are the factors which constantly produce a chance for road-accidents in the cities. It is evident that the increasing complexity of vehicles produces the problems being associated with the accumulation of all functions along an inter-regional road. The same road works in two faces one as a intercity

artery and the other as a venue of internal business activities resulting in over crowding of the streets that blocks up the free flow intercity traffic. The increasing vehicles in a complex add to this problem. The older forms of vehicles being displaced to lower order centres. With the existence of Two-seaters and Taxies the horse drawn carriages viz., Tonga, Ekka etc. started to be migrated from the city and take the refuge in countrysides or small centres.

Brightly, the town Jhansi has got a sufficiently wide and smooth National Highways along which its traffic flow mostly balanced. These roads bear the highest incidence of traffic in the region. In brief, the morphology and other site characteristics play a major role in determining the nature of transport problems of the towns.

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CHAPTER - 7

CHARACTER OF RURAL TRANSPORT

Like urban transport, the character of rural transport also has a great importance for rural lives. Rural transport means a contact between the villages and the urban service centres through the trip made for marketing or other needs. Further, it can be mentioned as a movement of persons and goods between the rural areas and nearer markets. These markets are service centres for rural communities and the rural transport connects them well. Generally, the markets are established at the point where the local or inter-regional roads converge and the numerous villages existed around them¹. In this way the rural transport denotes an interaction or relationship between rural and urban fringe. Generally, the markets are two typed -i.e. daily and periodic. The latter usually holds once or twice in a week and the former for a day-buyers and sellers dispersing before sun-set². The permanent business class brings a wide range of things from rural areas into these markets. The main commodities handled between them are foodgrains, particularly rice, wheat and pulses, flour, cloth, stone, forest products, fruits, salt, sugar, spices and daily necessities of life. These markets having the character of primary and secondary markets are

significant being performing the functions of concentration, equilisation and dispersion³. Concentration means the condence of commodities into the heart of markets. The function of pooling of urban and rural produce derived from various sources and equating them with the demand and supply, comes under the equalisation⁴. It is obvious that the nature and degree of rural transportation totally depend on the nature, importance, attracting power and distributional patterns of markets.

TRANSPORT ARTERIES :

Generally, the rural areas experience the lack of link and feeder roads as well as metalled roads in a great extent. Although the figure 4.3 (chapter IV) represents that the most of villages come into high degree of accessibility in the region and get the gain of intercity arteries but reality is some what other. If a village nearer within one Kilometre of an intercity road is helpless and also not capable for the transport of its persons and goods owing to the no connecting link may be counted as a isolated island. In rural areas the cart-tracks are only the main transport-arteries which connect well the villages with the marketing centres but they are not evenly

distributed. Within the region some areas such as Jalaun, Moth, Banda etc. having clayey and black soils are banned during the rainy season. But in the areas of rugged terrain and bad drainage like the Lalitpur Upland gneissic Plateau, the pack animals play an important role in rural transport on other detached routes.

As early stressed that cart-tracks are the main transport arteries through which the marketing functions take place. Therefore, they are examined as the veins, through which the life blood of the rural areas circulates. Now a discussion related with the density and distribution of unmetalled roads is usually pertinent.

DENSITY OF UNMETALLED ROADS

The Lalitpur region suffers more from unmetalled roads due to the undulating topography of upland. On the other hand, the whole Hamirpur region including Hamirpur and Mahoba sub-regions is relatively better served by metalled roads due to the ease construction than the former. The sparse population is also responsible for this reduction of density. In the Banda and Karwi region the density of unmetalled roads

ranges below 5 kilometres per 100 sq. Kilometres (fig. 7.1A). The parts of Jhansi and Hamirpur districts including Jhansi, Mauranipur, Hamirpur and Mahoba regions depict 5-6 kilometres density per 100 sq. Kilometres. The former lies in the west while the latter in the mid and covers the ravine land of the Yamuna in the north and intersected with its tributaries. The important metalled roads pass through this region and the railway diverges towards the north, north-east, south and east. The higher density of 6-8 kilometres is found in the Orai region. The main arterial routes in this region diverge from Jalaun to the centres of Orai, Kalpi, Auraiya, Moth etc. The highest density of above 8 kilometres per 100 sq. Kilometres is spread over the whole region of Lalitpur. In this region numerous unmetalled roads coming longitudinally and transversely from the interiors connect to feeder routes and centres like Talbehat, Mehroni, Lalitpur etc. The economy of the district of Lalitpur is less developed and depends more on its unmetalled roads.

There is another density of unmetalled roads based on population. Fig. 7.1B shows the varying relationship between the population

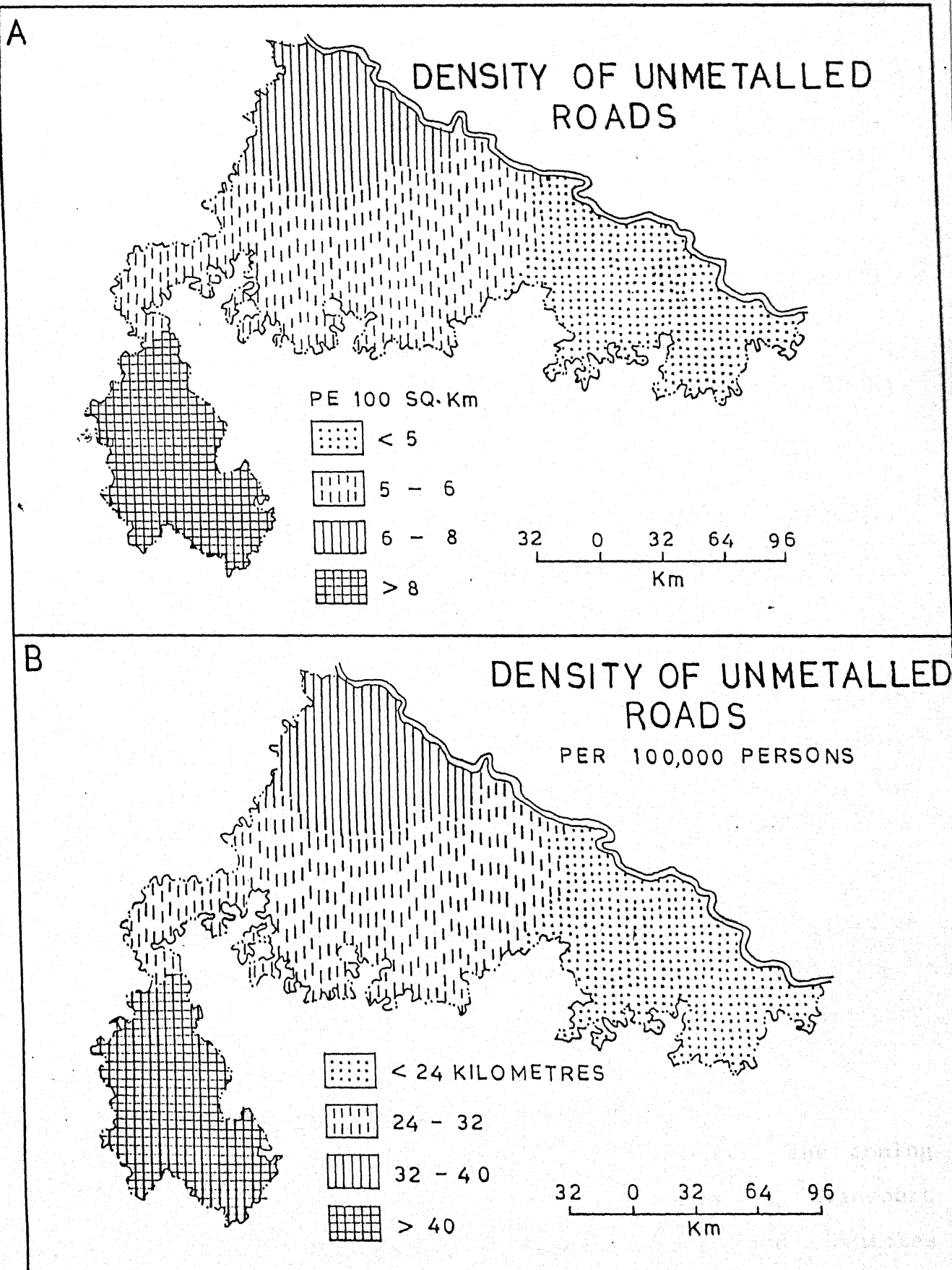


Fig.7.1

density and the density of unmetalled roads. There are four categories of such a density existing within the region.

- (i) The area having below 24 Kilometres per 100,000 persons covers the eastern part of the region in terms of whole Banda district.
- (ii) The second category of 24-32 Kilometres occurs over the Hamirpur and Jhansi regions.
- (iii) The third category of 32-40 kilometres per 100,000 persons includes the whole Jalaun district in the north-west of the region.
- (iv) The highest density of above 40 Kilometres per 100,000 persons is found in Lalitpur district due to the sparse population.

MODES OF TRANSPORT IN RURAL AREAS

From the pre-historic times till the coming of the railways, the usual means of transport were palanquins, horses, camels and vehicles driven by bullocks, buffaloes and horses. The

bulky goods was handled by the means of pack animals while valuable goods was carried by the carts and carriages. The tracts were the only links between habitations. The pack animals traversed long distance in large companies for business. They were called 'Cafilas' or 'Curvans', driven by 'Banjaras*'. In the medieval period people often used the wheeled vehicles for distant pilgrimages.

Probably the types of conveyances that were used in northern India were also in use in the region, among which were finely built carriages called bahals⁵, the oxen, the buffaloes and camels and always been the usual beasts of burden in the region and have been used for traction. Horses and ponies were very rarely used for drought purposes during Mughal Period. During rainy season their usefulness increases in the plains too when tracts get muddy and bullock carts can not ply. Since Ashok's period the 'tongas' are being used mainly to fulfil the needs of the rural masses. The carts were the forerunners of present day bullock carts and were suitably popular mainly for the transport of goods in rural areas. Though with the construction of roads and rails and mechanical

* The name is derived from the Sanskrit word 'Vaniyya' or 'Vaniyya Kara' (merchant). It was a nomadic tribe of public carriers. वाणिजक or वाणिजिक or वाणिज्यक means merchant or trader- vide, Williams, M.M. (1981) A Sanskrit- English Dictionary, Motilal Banarasi Dass, Delhi. P.939.

transport, the importance of wheeled vehicles and pack animals have declined only the main routes, but in case of bullock carts it can be put to its manifold uses and is employed by the people in the villages for different agricultural purposes as also for transport of people and goods during fairs and festivals and special occasions such as marriages⁷. One great advantage enjoyed by this vehicle is that it can pass through roads which are unfit for mechanised transport⁷. In old days camel, carts were a common means of transport which is disappeared now. Bicycles have also become very popular in villages because it is a very cheap means of transport. Generally, the milkmen also use bicycle for milk loading purposes from villages to city region. Because of numerous unmetalled roads existing in rural areas, the two-type vehicles e.g. wheeler (bicycle, tonga, bullock carts) and packed (horses, camels, ponies, mules, donkeys etc.) are more advantageous for rural lives. The following table (7.1) gives an idea of the density of pack animals per 1000 sq. kms. in various regions.

TABLE 7.1
DENSITY OF PACK ANIMALS (1985)*

SL. NO.	REGION	PACK ANIMALS PER 1000 KM ²
1.	Banda-cum-Karwi	447
2.	Hamirpur-cum- Mahoba	159
3.	Orai	162
4.	Jhansi	164
5.	Mauranipur	80.
6.	Lalitpur	115

The above table shows that the Banda region contains the highest density of 447 pack animals per 1000 km². The Jhansi and Orai regions rank next with 164 and 162 respectively. The lowest density of 80 pack animals per 1000 Km² is found over the Mauranipur region. The rest regions Hamirpur-cum-Mahoba and Lalitpur retain 159 and 115 pack animals per 1000 km².

* In finding out the density of pack animals the total pack animals of each region have been divided by the geographical area.

Thus, the study represents that the density of pack animals is high in those areas which are chiefly rugged and undulating, because these are more beneficial for transport purposes in such areas. Those villages that lie near the major district roads or near roads connecting one town with another, or through which such roads pass, now often have glimpses of mechanised transport as well as the low density of pack animals. Unlike other districts of the region, cycle-rickshaws are hardly to be seen in Jhansi district, probably due to the hilly nature of roads. The bullockcart is a suitable means of transport of agricultural areas. Their number increases as the house-holds increase. Majority of the agrarian society maintains it because it is a cheap and best as well as comfortable conveyance for the rural lvies.

MARKETS AND THEIR DISTRIBUTION

Bundelkhand is a land of fairs and festivals. The local fairs, markets (Hats) and Bazars play an important role in regional trade and commerce. These are the main business centres for the rural inhabitants which cater to the daily needs of the people. Some of them have large umlands where the businessmen collect

from large distances and have their daily, seasonal and annual requirements. Some of these centres are good marts of cattle, foodgrains, vegetable, ghee, cloths, daily use article, countrymade shoes etc. In some of the urban centres, district and tahsil headquarters daily markets meet but in a few urban and rural centres weekly and bi-weekly markets are held. In the local fairs and markets the retail traders of all sorts play their trade.

Broadly speaking, the region has two types of markets : -

- (i) Permanent or Daily markets and
- (ii) Temporary or 'Haths'*.

In Bundelkhand region daily markets are varied in size, layout and facilities available which are called 'Mandis'. These 'Mandis', may be in a specially laid out area enclosed by buildings and consisting of shops, godowns etc. These are such centres where the marketing of agricultural produce of all kinds is done daily. These markets are not suddenly developed

* 'Haths' are those markets where marketing is done weekly or bi-weekly.

but have grown up in a haphazard way. In starting their size is small but later on these service centres expand at considerable places due to increase of population. Jhansi and Mairanipur are typical examples. Other important urban centres of the region also come under this category.

The activeness of these marketing centres appears to be increased when their functions of 'haths' are absorbed. In the 'hats' people agglomerate once or twice in a week for exchange of commodities of needs. Locally these are called 'bazar' 'hat' Paith etc.

The following table shows the number and approximate percentages of weekly markets together with the bi-weekly markets in different areas.

TABLE 7.2
DISTRIBUTION OF MARKETS (1985)

REGION	NO.OF TOTAL MARKETS	PERIODICITY BI-WEEKLY MARKETS.	WEEKLY MARKETS AS PERCENTAGE OF THE TOTAL.
Bānda	46	7	31(67%)
Karwi	25	2	7(28%)
Hamirpur	44	6	18(41%)
Mahoba	57	5	47(82%)
Orai	40	13	14(35%)
Jhansi	21	5	11(52%)
Mauranipur	73	10	51(69%)
Lalitpur	49	6	37(75%)

Source: Statistical Magazines of the Districts.

The density of these markets varies according to terrain of the region. It is mainly because of the comparatively sparse distribution of population. The percentage of weekly market is high 82% in Mahoba region and low 28% in Karwi region. The proportion of weekly markets to the total in Orai resembles that of the Hamirpur, while Banda is similar to Mauranipur area in this respect. Jhansi has 52% and the Lalitpur 75% weekly markets of their respective total.

More than 75% of weekly markets is found in both regions viz. Mahoba and Lalitpur. The activities of these markets appear a highest points once or twice a week.

The bi-weekly markets are different on an account of their distribution in rural areas. Karwi region has the lowest number of bi-weekly markets (table 7.2) due to the compact rural settlements but sparsely located, where the cost and time of movement is more considerable. The village has not surplus products to sell in the markets, because poverty is the chief reason of such backward 'hats'. Besides this, various other social and historical factors are also responsible for regional variations. The highest number of bi-weekly markets exists in Orai region¹³ followed by Mauranipur (10), Jhansi, Lalitpur, Hamirpur, Mahoba and Banda are the resemble regions which have 5-7 biweekly markets in this regard. For the various trends in the distribution of markets the two blunt factors viz. the agricultural development and the distribution of settlements are responsible more.

PATTERN OF RURAL TRAFFIC FLOW

The rural traffic handles from village to village and market to market. Therefore, it is also essential to analyse the patterns of the arrival of different commodities into these markets. Naturally these reflect the nature and characteristics of rural traffic in different regions. The arrival of foodgrains (as wheat rice, Jowar, barley, gram, arhar, oilseeds etc.) in the main markets from the rural areas has considered as a rural traffic flow. The first, the fundamental characteristics are marked as a regional variations and monthly fluctuations in the arrival of commodities in different markets of the Jhansi Division. The second monthly fluctuations are associated with the regional crop's harvest. The difficulty of transport is experienced during rainy season. Between Kharif and Rabi crops the highest amount of arrival is recorded between March and June every where. Thirdly, the arrival of commodities abruptly declined in rural areas during rainy season and so the markets become inactive.

The regional variation have been discussed above, is marked in different parts of the region. In the north-western part of the region Kalpi,

Orai and Konch are the main markets with the higher amounts of wheat, gram and barley (1,95,000 metric tons). In the western and southern parts of the region Hardiganj market Jhansi and Lalitpur are the two most important 'Mandis' where Jaggery, wheat, gram, jowar, barley, arhar and oil-seeds are brought and sold. Jhansi is the biggest 'mandi' where about 55000 metric tons (1985) of agricultural products are being sold annually. There is, however, an inverse relationship in the Jhansi and Lalitpur regions, in that the former has less number of markets (21) and greater amount of grains (1,15000 metric tons) while the latter has greater number of markets (49) and lesser volume of grains (79000 metric tons).

In the mid, north-west and eastern part of the region Mauranipur, Hamirpur and Banda are the other main marketing centres which have great importance for wheat, rice, gram, linseed and barley. Atarra, a rice bowl of the region, is famous for paddy as well as for rice collection (65,600 metric tons) by all neighbouring villages during kharif season. In these areas the markets are enlarged more than the western part because of the plainy, fertile surface and village road connections.

There is an attractive feature of contradictory relationship between the crop production and grain arrival at the markets. Jhansi region is a typical example where the most important grain is the 'gram' but the amount of wheat flowing in the markets exceeds all other commodities. In Kharif crop's season the chief agricultural product is Jowar. Jhansi region covers the largest area under this crop in the whole study area. Barley is not favourable crop so it is grown mostly as a mixed crop with wheat, gram, mustard and linseed. It's arrival in the market has no significance for rural traffic flow.

The following causes are responsible for the above variational trends : -

- (a) The commodities of foodgrains mainly wheat and rice are exported by rail, road hence, little amount comes in the markets by road transport.
- (b) There is a great difference between the villages distant from metalled roads. So the farmers bear an inability for arriving the agricultural products.

in the markets. The following table gives an idea of number of villages which are inaccessible more.

TABLE 7.3
NO. OF VILLAGES DISTANT FROM METALLED ROAD (1985)

REGION	WITHIN THE VILLAGE	WITHIN 1 KM.	1-3 KM.	3-5 KM.	5 KM AND ABOVE.
Banda	122	10	97	86	364
Karwi	55	8	103	96	268
Hamirpur	80	12	47	59	122
Mahoba	82	36	105	101	286
Orai	183	42	156	240	342
Jhansi	82	17	75	71	147
Mauranipur	64	7	72	73	161
Lalitpur	108	27	84	80	382

Source: Statistical Magazines of the Districts.

- (c) Markets are not available at proper distance from villages. Therefore, in lack of 'hat' mass of village products does not get a bright chance for selling. The following table stresses that only few villages get a benefit of adjoining markets.

TABLE - 7.4
NO. OF VILLAGES DISTANT FROM 'HAT'/MARKET

REGION	WITHIN THE VILLAGE	WITHIN 1 KM.	1-3 KM.	3-5 KM.	5 KM AND ABOVE
Banda	16	18	35	66	539
Karwi	06	09	26	67	423
Hamirpur	15	10	24	50	209
Mahoba	27	14	23	62	483
Orai	23	10	51	153	714
Jhansi	06	05	29	37	305
Mauranipur	38	02	35	36	266
Lalitpur	20	07	18	55	579

Source: Statistical Magazines of the Districts.

- (d) Considerably those commodities appear in the markets which have higher price. As gram in comparison to other food-crops is higher priced and because of low production it is not transhipped to other regions by rail or road, but locally is brought to the markets for money fetching. Wheat and rice come next for this variation.

Besides these variational trends related with grain traffic there is another type of

rural traffic between the villages and market centres or rural areas and urban centres having a number of daily needs like vegetable, milk, fruits, fuel, woods, etc. which form a major part of the land use in umland. The umland of these markets is confined by the daily range of the rural conveyances. The spacing of the market town becomes as their hierarchical order.

In addition to non-wheeled conveyances (pack animals), the wheeled transport (like cycles, trucks) came into being after 1930 as working in rural areas. Because of its door to door service and cheap price, the cycle is virtually choiced by all people. In modern cycle age most of the perishable commodities like milk, vegetable, fruits, etc., are carried on them from rural areas to the urban centres. In some ways trucks and private stage carriages penetrate into interior areas and also originate from interior villages. Trucks play a significant role in case of supplying the goods between the rural and urban areas. With the rising of mobiled vehicles around the big cities influencially the rural conveyances also appeared to be increased.

Concludingly it may be said that at

present the rural transport is not more satisfactory. The agricultural produce is the main item of rural traffic flow. The flow pattern is rather eccentric. During the rainy season the volume of traffic flow is scarced more than the summer - because the condition of carts does not allow a small measure for the sudden disposal of commodities.⁸ Therefore, the economy of the rural areas goes to greatly unbalanced. Comparatively, those rural areas lying around urban centres are beneficial in transport facilities than the interior. The means of rural transport play a significant role for rural economic development.

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CHAPTER - 8

TRANSPORT AND TOURISM

IMPORTANCE OF TRANSPORT IN TOURISM :

Transport, a fundamental need of tourism works as a movement of persons for the recreational purpose from one place to another as a result of shorter working hours, longer-holidays, increased income, improved facilities and individual-wills. Really, the recreation may be passive or active in its nature, though both, and especially the latter, normally include some form of transport. The well improved transport, especially the bus-service has urged the increased numbers to participate in recreational activities, especially activities of a more exotic type which are often not locally based and which involve some travel to reach activity destination, e.g. sailing, gliding, rock-climbing and pony-trekking. Thus, in long view, the tourism is related with only an aspect of recreation and depends upon the great and ever developed transportation. It is obvious, that tourism discloses the relation of spatial interaction between the origin and destinating centres of a trip, made for a needful purpose. Former implies a movement away from the place where people normally live and work, and therefore,

transport, which makes travel possible, is an essential pre-requisite for tourism.

People travel from place to another for multi-purposes, but among them the important one is the change of environment with all that this implies in terms of scenery, climate, human-contacts and differing ways of life; the wish to visit new foreign attractive places, which are the strange to their experience, is a major element in origin of tourism. For regional differentiation the places have individually characterised, but the uniqueness is predominant factor in tourism. The different regions are separated by physical distance one another. Such physical separation entails travel and travel, in turn, necessitates transport. Therefore, transport may be said to be one of the three basic important components of tourism, the other two have introduced as holiday destination and provision, for accommodation of food and place to tourist. The tourism and recreation are so complicated by this fact that both use common facilities. The territory and category of transport determine the form of geographical and economic aspects of tourism. Evidently, transport has been a cause and an effect of the growth of tourism; improved

transport facilities have stimulated tourism; the expansion of tourism has stimulated improvements in transport¹. Now the tourism being the fastest growing item in world-trade.

THE FUNCTION OF TRANSPORT IN TOURISM

Essentially, transport is the soul of tourism. In absence of transportation the tourism is dull and dead. By definition, tourism involves movement to areas away from where a person normally works and lives. Transport with all its changes influences the growth and development of tourist centres and, therefore, controls and determines the geographical spread of tourism.

The rank, quality and characteristics of transport-network affecting the accessibility of tourist centres, are of great importance. The travel happened through such tourist places is other important factor which makes the tourism, a strong. Near the mid twentieth century resorts such as Mahoba, Kalpi, Orai, Babina, Orchha, Charkhari etc. owed their popularity to rail links with Jhansi. In Jhansi region some places such as Gupta-Godawari, Hanuman Dhara (Banda) are not very accessible in terms of public transport. Jhansi and Chitrakut (Banda) are the chief tourist

centres in the region. The contribution and relation of transport with tourism can be seen into the following heads.

RAIL TRANSPORT AND TOURISM

Railways played an important role in the development of holiday-making and tourism, because of having cheap, pleasure and safed-travel. In the ending of nineteenth century when the railway-lines of Jhansi-Manikpur, Jhansi-Itarsi and Banda-Kanpur were constructed the existing tourist places connected well with them. The development of railway network coincided with the growth of urban centres, especially Jhansi and Banda. During the period of second world war the railways discouraged to develop these tourist-resorts. After some time the metalled roads competitively challenged to railways. In the region, Jhansi stands the most significant tourist centre furnished with modernisation of railways, which attracts the visitors more and more. The other main resorts linked with railways having minor importance are Kalpi, Orai, Moth, Babina, Lalitpur, Orchha, Barwasagar, Mauranipur, Mahoba, Chitrakut Dham Karwi and Manikpur. At a result of growing population, urban expansion and growing congestion on the roads, the railway stands more affective. The visitors come to Jhansi

from Lucknow, Delhi and Bombay and to Banda from Kanpur, Allahabad, Itarsi by rail and car. In brief, for long distance travel, continuing improvements in speed, punctuality and other comfortabilities of service, the tourists prefer railways more than the others.

ROAD TRANSPORT AND TOURISM :

As early stressed that roads in nature challenge to rail's superiority. All the tourist-places are survived by the road-transport. Calcutta in the east, Bombay in the south, Delhi in the north-west and Kanpur-Lucknow in the north are the centres from where a huge majority of tourists enters into region for recreational purpose. Generally, the tourists come to region by bus, while Jhansi by car from Kanpur. Visitors including tourists reach Banda by rail, bus and taxi².

Experiencely the local buses, cars, taxis are very comfortable for tourism as well as Indians and foreigners. The U.P. Govt. Roadways, M.P. Roadways and some private individuals operate their bus-service on several routes linked with the tourist centres of the region. The Kalinjar, Deograh and Chitrakut are connected only by road, while most of them by both rail and road respectively. The main intra-region routes are radiated from

Jhansi towards the places of Lalitpur, Garauth, Moth, Erich, Mata Tila, Chirgaon, Mauranipur, Madaura, Banpur and Dhaura.

The adequacy of motor-way network in relation to tourist needs is the evident fact, that urges to persons for travelling. Often it is mentioned that in the region motorway network connects only major centres of population. Resort-areas are served by motor-way only if they happen to lie on or near a route between two major population centres. While the connection should be also with small and near centres. The reason for this state of affairs lies in the economic appraisal of road schemes. Value of time savings is the largest element in the benefits of a road-scheme, but for non-work purposes like tourism, such savings have only a low hourly monetary value attributed to them. Although within the region all tourist-centres are inter-connected but it is not sufficient merely to make tourist areas more accessible they themselves must also be able to deal with the extra volume of visitors. If they cannot, there is a danger that the benefits of tourism to all visitors will be reduced. In conclusion, it may be useful to quote concerning the principles that must govern road development

if tourism is to benefit³.

WATER TRANSPORT AND TOURISM :

Transport by water though relatively less important than roads, at least for passenger travel, still makes a significant contribution to tourism. In the context of present day tourism, water transport may be thought of as fulfilling two main roles, ferrying and cruising. But the Bundelkhand region is backward in the water-transport centres to facilitate the tourists. As early stressed (Chapter III) that all rivers, except Yamuna are unable for water-transport. The tributaries of Yamuna, such as Betwa, Dhasan, Pahuj, Ken, Chandrawal etc. avail the facility of ferrying and cruising to the people at some important places. After Yamuna the river Betwa is minor-advantageous for having 11 ferry centres. The tourist places of Rajapur (Banda), Hamirpur and Kalpi situated on the right bank of Yamuna have had more attracton. They operate the inter-region and intra-region traffic flow nearer with the Kanpur and Allahabad of the 'KAVAL' towns of U.P. Though services may run for all months of the year, but in rainy season mostly banned by the flood. A majority of visitors enters into the region by these main 'gate ways' of northern

region. In other words Kalpi to the west, Hamirpur to the mid and Rajapur to the east connect the tourist places of region. Now by the development of roads and railways the water-transport related with tourism is less advantageous.

THE NATURE OF TOURIST-FLOW :

The above features concerning with the correlation between transport and tourism obviously denote that well developed, comfortable and high ranked means of conveyance are more affective in case of the nature of tourist flow. The tourist flow increased and decreased by the historical, religious and political importance of places. Owing to this reason the tourist flow has led to diversity in its nature. In other words, the majority of visitors highly depends on brightened resorts. Fig. 8.1A depicts the volume of tourists which enter into the region from the various places by the suitable means of transport. Chitrakut has the peak position in regard of total tourists in the region. here visitors come from many far away places, e.g. Allahabad, Jhansi and Satna by the road and rail transport. In every month, at the occasion of Amavashya, the persons huddle here in great number for religious purpose. During 1985, 766000 and

BUNDELKHAND REGION (U.P.) TOURISTS ENTERING THE REGION 1985

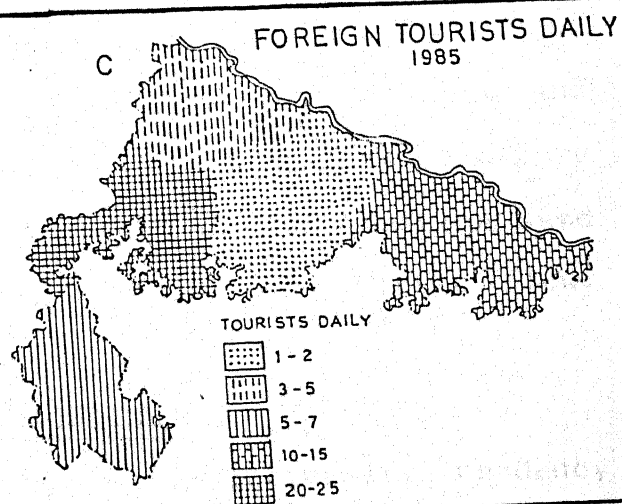
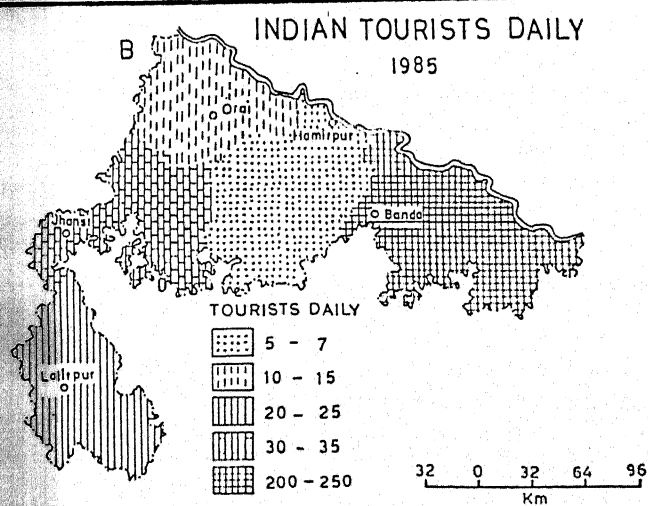
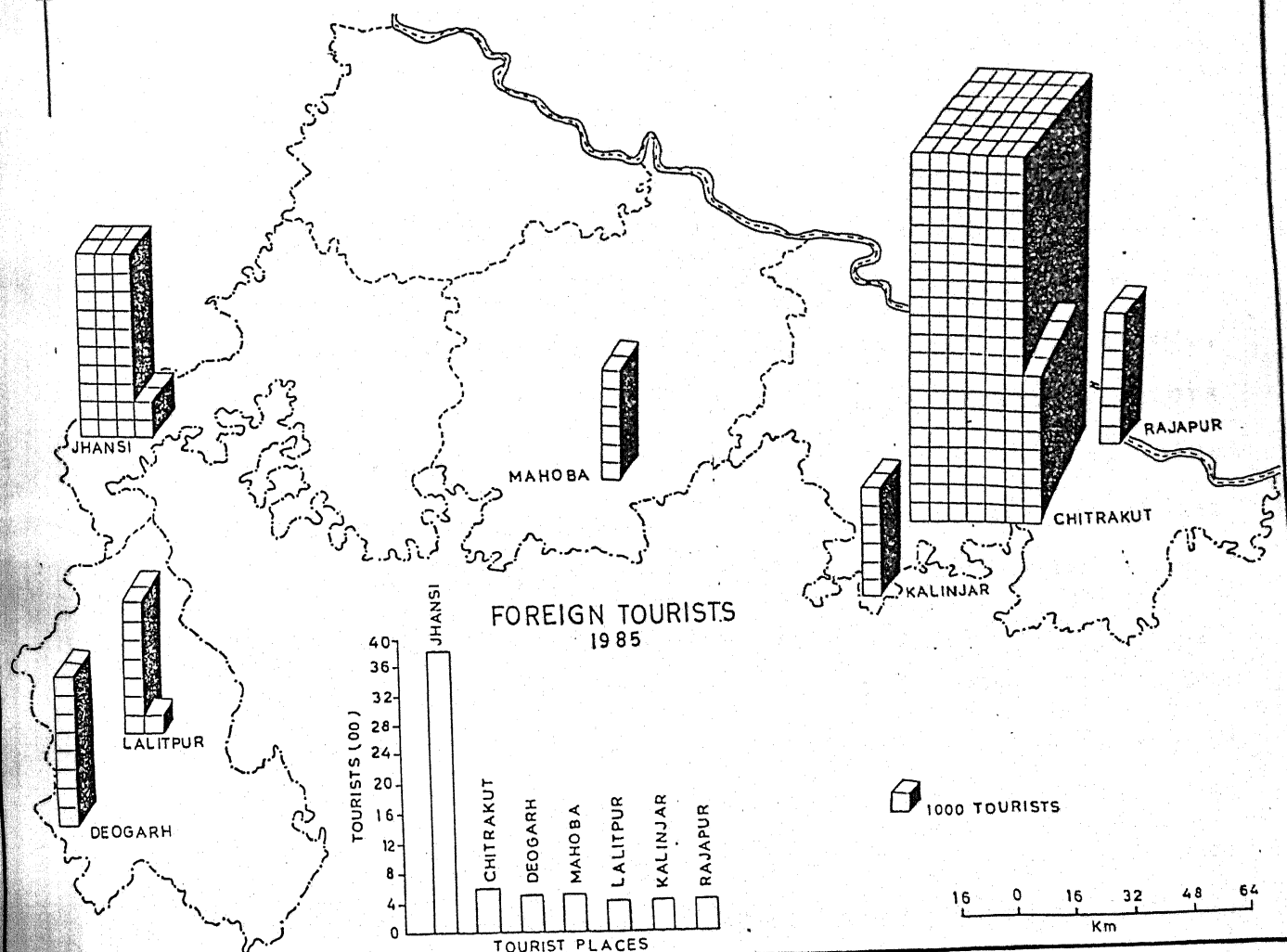


Fig. 8.1

65000 tourists both India and abroad, had visited to Chitrakut and Jhansi, the religious and historical places respectively. The other places of region have attracted about 3850 persons from Delhi-Jhansi, Knapur-Jhansi, Bombay-Jhansi and Allahabad-Jhansi via Manikpur route. Except Muslim countries, the others as England, Germany, France, China, Australia and U.S.A. urge their visitors to visit India. Kalinjar and Rajapur have a slow movement of tourist flow of 385 & 380 visitors, where the road connection is only predominated. Although these tourist-destinations are of historical importance but because of poor transportation, interiority, less comfortability and limited amount of information for passenger-flow had not advanced. Deogarh, Lalitpur and Mahoba are the other tourist centres where persons achieve better facilities of cruising and halting. Therefore, the tourist flow is higher than the Rajapur and Kalinjar. In brief, it is clear that the nature of mode of transport, rank of destination and facilities determine the nature of tourist flow.

INCREASING TENDENCY IN TOURISM :

Table 8.1 shows the increasing tendency in tourism since 1980 to 1985. It clears that owing to the several great attractions the increasing

per art of tourists enhanced as 2.24, 4.36, and 6.62, since 1980 to 1982. In 1983 with the normal increase of total tourists the increasing per cent of tourists was decreased as + 1.52% and in the next years it emerged as 3.82% 3.79% respectively. For this decreasing, during last three years, many other resistancive factors are responsible. But now tour operators and tourists are continually searching to enlarge upon existing travel opportunities. Their success to obtain this goal will depend primarily upon the opportunities offered by the transport development.

TABLE - 8.1
TOURISTS ENTERING THE REGION

YEARS	TOTAL TOURISTS	% INCREASE
1980	7,64,781	+ 2.24
1981	8,00,150	+ 4.36
1982	8,53,148	+ 6.62
1983	8,66,178	+ 1.52
1984	8,99,314	+ 3.82
1985	9,33,415	+ 3.79

Source: Directorate, Regonal Tourist Office, Jhansi.

TOURIST-PRESSURE ON TOURISM :

Both the inset figures 8.1B,C pronounce the different categories of pressure of visitors on existing tourist centres in the region. On an account of daily travelling Indian tourists, Banda, specially Chitrakut belongs the highest pressure of 200-250 visitors, which is one of the significant religious places in India. It has also the attracton of well developed road-transport connected with karwi, Banda and Satna, and other local hotel and motal accommodations. Jhansi district bears the load of 30-35 persons coming daily from the numerous places of India, and abroad. A step is generally desirable to improve the rail and road routes which immediately effect to force tour operators to turn towards this historical place. The pressure of daily visitors of 20-25 persons is found in Lalitpur and 10-15 persons in Orai respectively. The lowest category of 5-7 visitors daily is caried by Hamirpur, because of leading inferiority in transport and lackness of other spatial accommodation. In a distinct view of pressure of foreigners on tourism, Jhansi stands the first, which consists 20-25 persons daily, being more desired place for visiting. After Jhansi, the district Banda records the higher pressure i.e., 10-15 foreigners daily

followed by Lalitpur (5-7 foreigners daily), Orai (3-5 foreigners daily) and Hamirpur (1-2 foreigners daily) districts.

ECONOMIC ASPECT OF TOURISM

There has been an upsurge of interest in the geographical and economic aspects of tourism. Travel for this purpose creates its own type of flow and has certain peculiar characteristics. Alongside the physical flow, there is a spatial shift of spending power and this has implications for both regional and national economic development. The potential of inter-regional tourism as a development catalyst has only really been recognised over the last years. This is undoubtedly a consequence mainly of increased transport opportunities. Because transport charge has helped to promote tourism and so use resources.

Suffering the troubled economic climate the growth of recreation and tourism of the region has continued. The total receipts from regional tourism continue to rise consistently. In 1982, although the volume was down, total receipts were Rs. 560 crores, a 16.18 per cent increase in 1981. In 1980, the total receipts were 482 crores, a highest increasing percent 42.60. Except

this, in 1985 with the growing volume of tourists, the increasing per cent of total receipts was 33.92, as well. In brief, tourism plays an important role as increasing the income for nation like a unnatural resource.

SOME INTERESTING TOURIST PLACES

CHITRAKUT:

Chitrakut, the heaven of love-lorn "Yaksha" of Kalidasa is one of the most ancient places in India. It lies among the northern spurs of Vindhyan ranges, in Lat. $25^{\circ} 10' N$ and Long $80^{\circ} 53' E$. at a distance of 270 Km. from Jhansi, 285 Km. from Lucknow, 120 Km. from Allahabad, 70 km. from Banda and 5 km. from Chitrakutdham Karwi, Station of the Central Railways. Chitrakut is not the name of any particular place or township, but it represents a group of five small townships which are Karwi, Sitapur, Kamta, Khohi and Nayagaon. The present name of this complex is Chitrakut Dham. The most important of the five townships is Sitapur, which is generally known as Chitrakut.

Chitrakut, a celebrated place of pilgrimage, lies some 10 km. south of Karwi. The hill which is the object of pilgrimage, is known as Kamta Nath, and the name Chitrakut is

applied to the hill, the 'Parikrama and the locality generally. The name of Kamta Nath is the same as Kamda Nath meaning the 'lordly granter of desires' and the hill is said to have attained its great sanctity in the Treta Yug, when Lord Ram alongwith sita and Lakshman lived long here for some time,during exile. Its praise have been sung by sages like Valmiki and Tulsidas and many later poets. The name Chitrakut - from Chitra, of various colours and Kut, a hill - is said to have been given it from the number of different coloured stones found on it. Round the base of the hill is a terrace, on which pilgrims perform the Paikarma. It is said to have been erected about 1725 A.D. by Rani Chandra Kunwar, the queen of Chhatra Sal, the great bundela leader. To the south of Kamta Nath is the Lakshman Pahari, named after Lakshman, the younger brother of Ram. It is said that from this hillock Lakshman used to watch over Ram's hut on the Kamta Nath hill. There is a temple on the top of the hill constructed in the memory of Lakshman. The Paisuni river flows at a distance of about one kilometre from the base of the hill to the east and there are thirty-three places of worship dedicated to various deities, situated in the low surrounding

hills on the river banks, and in the valleys and plains at the foot of the hills, all of which are connected with the various ceremonies of pilgrimage performed at Chitrakut. Among these places, Pramod Van, Janki Kund, Phatik Shila, Sati Ansuiya, Gupta Godavari, Hanuman Dhara, Kot-Tirth, Devanganga, Ganesh Bagh, Bharat Kup and Ram Ghat are much frequented by devout Hindus, who go through the ceremonies of bathing meditation, are easily approachable from here.

U.P.Tourism maintains a newly constructed and well furnished Tourist-Banglow at Chitrakut with modern amenities. P.W.D. Inspection House and Forest Rest House belonging to Uttar Pradesh Government are also available. Other accommodations available here are Jaipuria Guest House, Goenka Dharmshala, Sri Ram Dharmshala, Calcutta Dharmshala and Maa-ki-Dharmshala.

DEOGARH :

Lying in Lat. $24^{\circ} 15'$ N. and Long. $78^{\circ} 15'E.$, Deogarh is situated on the right bank of the Betwa at a distance of 123 Km. from Jhansi at the western end of the table land of the Lalitpur range of hills in extremely picturesque natural surroundings. Distance of Deogarh from Lalitpur

is 33 Km. The nearest railway station is Jakhlaun about 11 Km. away.

Deogarh has great antiquarian, epigraphical and archaeological importance and figured in the history of the Guptas, the Gurjara Pratihars, the Gonds, the Muslim rulers of Delhi, Kalpi, Malwa, the Bundelas, the Marathas and British. It possesses the remains of a five Vishnu temples of Gupta period and a group of old Jain temples. The former is also known as Sagar Marh. The exquisite execution and beautifully carved panels of the temple have called forth the remark that "few monuments can show such high level of workmanship, combined with ripeness and rich refinement in its sculptural effect as the Gupta temple at Deogarh.⁴.

Perhaps of some what later origin but no less rich in archaeological and epigraphical value is a group of Jain temples situated inside the fort of Karnali on the hill overlooking the Betwa. Some 31 of these are still standing. Some of the panels depict scenes from Jain Mythology and there are typical pieces of Jain architecture and sculpture such as the Manas tambha (Votive pillar), Ayagapatta (Votive tablet), Pratima-

sarvato-bhadrika (Jain image visible from all sides) and Sahastrakuta (Pillar carved with a thousand Jain figures).

The thick forest on the hill is a haunt of wild animals. Red stone and fire-wood are the two objects of commercial importance available in this area.

MAHOBHA:

Easily the oldest and historically the most important town Mahoba lies in lat. $25^{\circ} 18'$ N. and Long. $79^{\circ} 53'$ E., and is situated on Kanpur - Sagar road and Jhansi-Manikpur section of the Central Railway at a distance of 85 Km. from Hamirpur and 140 Km. from Jhansi.

Mahoba is believed to have existed from times immorial, and to have borne different names at different times. During Treta Yuga it was known as Kekpur and in the Dwapar Yuga as Patanpur. Its present name 'Mahoba' is said to be derived from the great celebration or Mahotsava, performed by Chandravarman, about 800 A.D. It is associated with the history of the Chandels who ruled over modern Bundelkhand from 9th to 14th century A.D. It was a civil

capital of Chandels about 900 A.D. for the earliest Chandel sovereign locally commemorated is Rahila, whose lake Rahila Sagar, lies about 3 km to the south-west of Mahoba. About 1182 A.D., the fierce battle was fought at Mahoba between Prithviraja and Alha and Udal, the Banaphar generals of Parmala.

The extent of the place in the days of its glory was doubtless greater than is covered by the present town which still has a number of historical, archaeological, religious and scenic spots of interest.

The most noticable feature of the town is the lakes or tanks (Sagar), all of which are formed by means of massive embankments thrown across shallow valleys. The important of them are Disrapur Sagar, Rahila Sagar, Vijay Sagar, Kirat Sagar, Madan Sagar, kalyan Sagar and both Ram Kund and Suraj Kund.

KAKRA MATHS is the only temple which has escaped from destruction and is situated in the north-west corner of Madan Sagar. It follows the plan of Khajuraho temples. A mark of the lingam in the middle of Sanctum indicates its Shiva character. There are also the remains of a large temple, now known as Madan Temple dedicated

to Lord Vishnu.

KALINJAR :

The celebrated hill fort and town of Kalinjar is situated on the old road to Nagod about 56 Km. south of Banda. The nearest railway station is Atarra which is 38.6 Km. from here. The hill on which the fort is built is situated at the south-eastern edge of the plains of Bundelkhand. There are seven gates in the Kalinjar fort named as Alam Darwaza, Ganesh Darwaza, Chandi-Darwaza, Budhbadr gate, Hanuman Darwaza, Lal Darwaza and the main gate.

Except the above seven gates, the important other visiting places as Patal Ganga, Pandu Kund, Buddhi Talao, Siddh-ki-Gupha, Pani-ki-aman, Mirhe-Bhairon, Mrigdhara, Kumbhu, Parmal-ka-baithaka, the Boar Avatar, Nilkanth temple and the cave are some of the attractive places of tourist-interest at Kalinjar.

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CHAPTER - 9

TRANSPORT AND REGIONAL DEVELOPMENT

THE ROLE OF TRANSPORT IN REGIONAL DEVELOPMENT.

The relationship between transport and economic development is a matter of empirical importance rather than theoretical. On the regional development issue much attention was paid in both the advanced and less advanced countries such as U.K., U.S.A., France, Germany, China, Brazil etc. It concerns also an extremely topical and controversial area of study. The economists seek to explain how transport infrastructure developments and improvements can be included in their theories of regional economic growth. The geographer is more concerned with the spatial implications of such developments and their impact upon the socio-economic activities in a particular region. The politicians on the other hand would like to know more about the relationship since it would help in the general allocation of government expenditure in the economy. It should be considered with the all orientations. The aim of this study is to provide an integrated view of the role of transport in development at both regional and sub-regional level.

It is obvious that the pattern and the degree of development of the transport network in any area is the first need of crucial significance and political, economic and social progress and be required for every stage of regional development planning. About the matter Mr. Munby remarked "there is no scope from transport"¹. In the modern age the daily rhythm of life is closely geared to it. For the rapid economic development and new strategies of planning, it should be modification or renewal in inherited transport system.

From the above discussion it is cleared that transport is a factor of great economic development. But about its importance, there are different thinkings in the nations. As in the west it is assumed that adequate transport facilities are basic for economic progress. Hunter remarked, "the role of transport was accorded a secondary rather than a primary role in economic development"². Supporting this Eliot Hurst says "without resources to be utilized, access has no meaning"³. In other words transport development is worthless without potential resources. The other views concerning with the nature of the

relationship between transport and development have been subjected to reappraise, that this does not bring into question the basic importance of transport since it is undeniably a fundamental factor for economic development. As soon as the economy increases relatively more transport is required. The relationship between transport and development may be said to fall three categories: First the transport is dealt with as a precondition of economic development resulting the positive stimulus; second there is the view that transport postdates economic growth or in other words is a result, rather than a cause of economic development and third, there is the middle or natural view that transport development is concomitant with economic growth, that it is neither a prerequisite for nor a result of economic growth, that it is neither a prerequisite for nor a result of economic development but goes in hand with it and is neither more nor less importance than any factor in economic growth. For support G.W.Wilson says, "transport investment is no more an initiator of growth than any other form of investment or deliberate policy⁴".

According to Hoyle "the transport/development relationship is essentially a

two-way interaction process; and the results of the interaction depend upon the type of economy involved and upon the level of development at which transport improvements are effected⁵. Having considered, if only briefly, the role of transport in development, we can see in Bundelkhand region (U.P.). It will be easy to explore the contribution and relationship of transport in development in main and sub transport regions respectively.

TRANSPORT REGIONS:

Holding the view of areal differences the mention is pertinent that divides the area under study into different suitable transport regions characterised as uniform in nature and violence of problems related to transportation and playing an important role for planning set-up. Transportation is needed broadly for seeing the areal differences in cases of a design of things in motion and others. The design may be reverse of that for static regions, in as much as movements may be greatest across the borders of contrasting regions, whose very differences promote interchange.⁶ Therefore, transport regions may be ranked as nodal regions. On an account of essential element the circulation decides the functional or organisational structure of such regions⁷. These nodal regions are attracted for

having great focus with its surrounding area connected with circular-lines of transport. Circular lines bearing the movement of persons and commodities are primarily tributed. So the nodal region is bounded by the line of disappearance. The boundary line tends to run at right angle to the lines that tie it together. Thus this statement will be appropriate that the nature and character of transport arteries, as the intensity of traffic circulation, the degree of accessibility in varied forms and boundaries between influenced areas of major towns concerned with transportation have been introduced for traffic divide⁸. Being the focal points of local traffic the sub-regions also emerged around the secondary centres of the region.

Now the region is served by both rail and road transport respectively. Former is governed by Central and latter by State government. Though the rail is nationalised, but the road is partially operated by private operators. In brief, both are divided into different transport regions as below.

RAIL TRANSPORT REGIONS

The whole egion is served by broad gauge system. The whole system is governed by Jhansi division. Banda and Manikpur units are the sections

which control the railway as well. Jhansi division governs the trunk line from Delhi to Bombay, while Banda section covers the Hamirpur and Banda plain, north and east of Khairar junction. The rest part of Banda region is managed by Manikpur section serving on Allahabad Bombay main line. Similarly, this system of broad gauge, lying in the whole study region has been divided into three main and six sub transport regions. These are ;

- (i) Lalitpur, which includes the whole Lalitpur district,
- (ii) Manikpur, stretches over the Karwi and Mau tahsils. These both sub-regions lie under upland Transport Region,
- (iii) Jhansi, covers the area of Jhansi, Moth, Garauth, Mauranipur, Charkhari, Kulpahar and about half of Rath tahsils, which has considered into Transitional Region, and under Low Land Region,
- (iv) Banda, having Banda, Baberu and Naraini tahsils,
- (v) Hamirpur, including Hamirpur, Maudaha and about a half of Rath and
- (vi) Orai, covering whole district has connected with Kanpur and Jhansi.

In brief, the division Jhansi is satisfactory in general owing to their linear coverage and national outlook, from where the goods and passengers are transhipped towards Bombay, Manikpur, Kanpur, Delhi etc.

ROAD TRANSPORT REGION

The region has been divided into two absolute transport regions for the maintaining and controlling the movement of automobiles. These are Jhansi and Banda. But from the point of view of easy study both are classified into eight sub-transport regions, viz; Jhansi, Mairanpur, Orai and Lalitpur under Jhansi Region and Banda Hamirpur, Mahoba and Karwi under Banda Region. These subregions are based on nodality of centres and confined by the tahsil boundary.

Although the centres possess greater nodality in their respective regions yet there is a disparity in specific transport criteria and cohesion. Towards north there is such a position along the river Yamuna specially in Orai, Hamirpur, Banda and Karwi regions suffering from the lack of road-bridge. The prominent features of the different transport regions existing almost around the same nodal points have been distinguished as below (fig. 9.1).

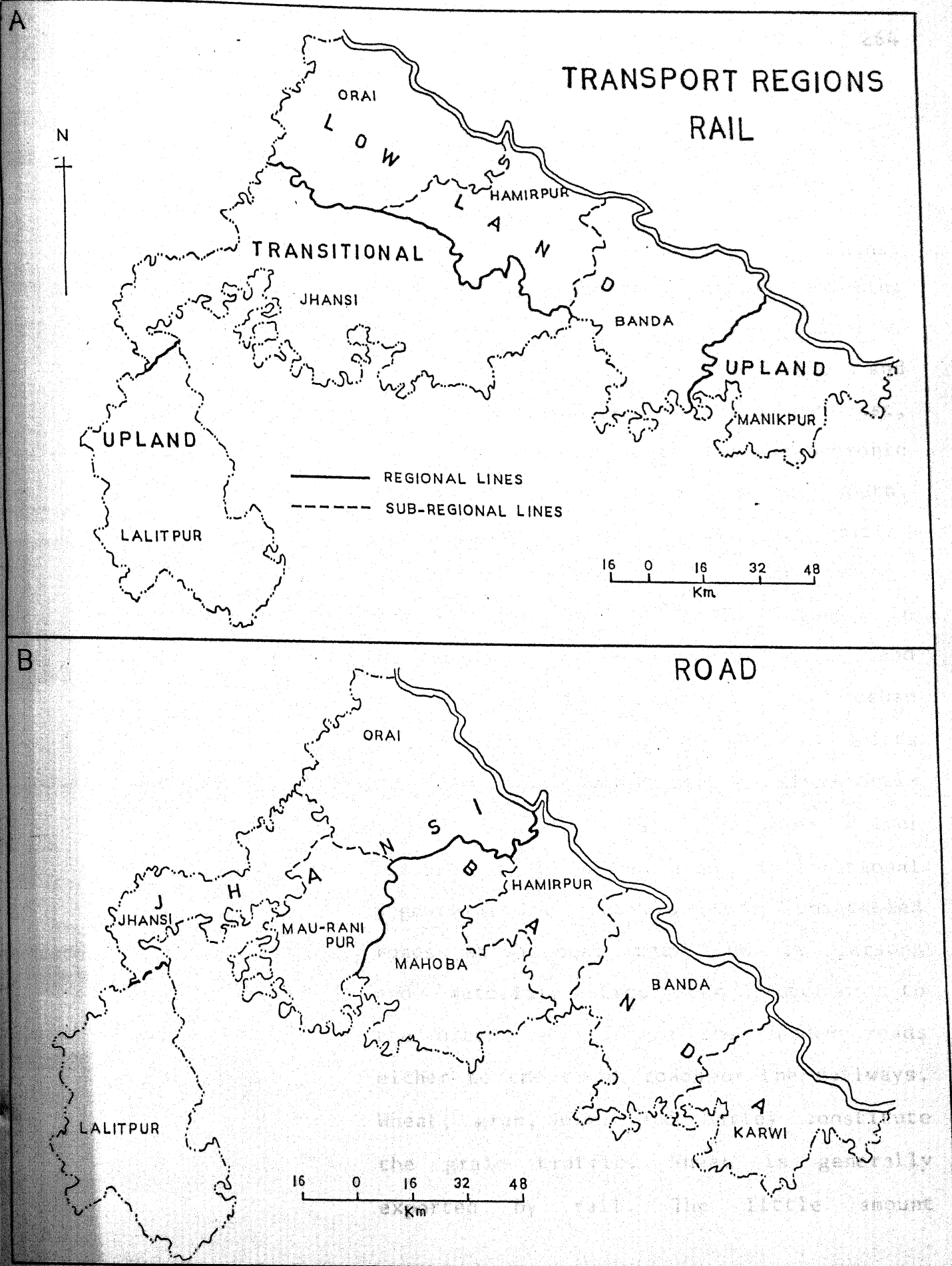


Fig. 9.1

(A) JHANSI REGION:

(i) JHANSI REGION :

It is a section of Jhansi administrative transport region covering the area of Moth and Jhansi tahsils. It touches the boundary of Orai and Mauranipur region in the north and east, through the 'Col' of four hour's isochronic line and Lalitpur region in the south. This region is well served by radial pattern of roads and herein traffic flow of men and goods is highest in the region. The density of carts and pack animals is lower. In the urban centres like Jhansi the bullock carts use pneumatic tyres fitted with boll-bearings on its axis. The power driven traffic flow perpetuates on National Highways. The metalled and unmetalled roads which bear the flow of persons and materials from the interior to the urban centres are the feeder roads either to the trunk roads or the railways. Wheat, gram, Jowar and barley constitute the grain traffic. Wheat is generally exported by rail. The little amount

of foodgrains arrives in the local markets. All the traffic is oriented towards Kanpur, New Delhi, Shivpuri and Sagar.

(ii) MAURANIPUR REGION:

It also comes under Jhansi administrative transport region covering the area of Garautha and Mauranipur tahsils. It consists a small inaccessible area in the south where above 6 hour's isochronic line delimits its boundary. The higher inaccessible patches lie in the north between Betwa and Dhasan river. Mauranipur region mostly lies in the Bundelkhand upland plateau and so it does not have integrated growth of roads. Mauranipur and Garautha are two widely spaced isolated nodal centres. The weekly markets are 51 and the 14% of the total markets are bi-weekly. cloth is an important item of traffic here. Wheat, gram, oilseeds together with vegetables are brought in the markets. The density of pack animals is lowest (80 per 1000 sq. Kms.). The bus traffic flow is very thin, but

the rail and road both are significant for carrying passengers and goods. From this region the traffic flow mobiles mainly towards Jhansi, Mahoba and Orai. The rail and road are parallel in competition.

(iii) ORAI REGION. :

This region also coincides with the Jhansi administrative transport region. Orai is the focal-point of this region from where the buses depart towards Kanpur, Auraiya, Hamirpur and Jhansi. It ranks first in case of frequency of bus service in the region. It touches the ravine land along the Yamuna in the north and M.P. in the west. The inaccessible patches extend more in the west and east, but in ravine land along the Yamuna very small. Its 56.51% area is accessible within 4 Kms from metalled road (240 villages). The hand-made paper is the main item of exporting. Wheat, gram, oilseeds, together with bajra and pulses are the major commodities for rural and interregional transport. The percentage of bi-weekly markets is 32% of the total markets in comparison to 24% of the Jhansi

region. The road transport is keen competitive to Railways in this region.

(iv)

LALITPUR REGION :

It stretches over the southern upland plateau covering the whole Lalitpur district. It is confined with M.P. In all sides except in the north where its boundary passes through the 'Col' of two hour's isochronic line. It coincides the highest area of 5042 Sq. Kms. in the study region. Its small inaccessible patches of above 6 hours isochrone are few in the south, but more in south-east. Lalitpur is the main nodal point which is competitively serviced by rail and road regardly. From here the traffic is inclined towards Jhansi and Sagar, Wheat, Vegetables, Mahua, Oilseeds, together with honey are the items brought in the markets. It ranks second to Mahoba region in case of weekly markets as 75% of the total markets. The density of pack animals is lower (115 per 1000 sq. Kms) in the region. Here Deogarh, is an important historical place for which buses ply

from Lalitpur.

(B) BANDA REGION:

(i) BANDA REGION:

It covers the area of Banda, Baberu and Naraini Tahsils stretched over the Banda low-land and upland gneissic plateau. This region is boundaried along the river Yamuna in the north, Hamirpur region in the west, M.P. in the south and Karwi region in the east. It's plained area possesses the highest accessibility in the whole region (63.79% within 4 kms of roads). The inaccessible areas lie in the east and west of the region. There are very small patches of inaccessible areas of 6 hour's isochronic-line. Here the road transport system tranship passengers more, than the goods. Rice is the main item of exporting traffic. Wheat, potatoes, pulses and gur are the main commodities, which arrive in the marketing centres. Jhansi-Manikpur and Banda-Kanpur railway lines pass through the region. From Banda region the traffic flow radiates

towards Kanpur, Behraich, Allahabad and Jhansi, through State highways. It has the highest density of pack animals (447 per 1000 sq. kms). in the whole Jhansi Region. The bi-weekly markets are 07 and the percentage of weekly markets is 67% of the total markets.

In this region the traffic flow has enhanced upto Fatehpur district across the Yamuna through the ferries of Chilla and Augasi main.

(ii) HAMIRPUR REGION:

It includes Maudaha and Hamirpur tahsils and delimitates the ravine land along the Yamuna in the north and Mahoba and Banda regions in the south and east. The orai region constitutes its western boundary. In south-west of Hamirpur region there is a biggest part of inaccessible area of above 6 hour's isochronic line. The rail and road transport connect it from Kalpi, Kanpur, Banda and Mahoba. This region carries the highest volume of

traffic in Banda administrative transport region. Wheat, mustard oil and Maurong are the important commodities that are brought to the markets. Wheat is brought from rural areas to the urban centres. The percentage of bi-weekly markets is 13% and the weekly markets are 41% of the total markets. The density of pack animals is 159 per 1000 sq. kms., the moderate. Here the bullock carts are widely used for rural traffic; because of the flat topped surface and better roads. Bus traffic flow is moderately significant which connects it with other parts of the region.

(iii) MAHOBA REGION:

It covers the area of Mahoba, Kulpahar, Charkhari and Rath tahsils. This region is constricted towards south and east by the M.P., Mauranipur region in the west and Hamirpur in the north. The density of pack animals is less. The percentage of bi-weekly markets is 13%. It has the highest per cent of weekly markets of 82% of the total markets in the whole study region. Rail

and road are important transport arteries which link it from Jhansi in the west, Hamirpur and Kanpur in the north and Manikpur, Allahabad in the east. Wheat, flour, oilseeds, gur, betel-leaves, tobacco, lotus root and fish are the main items brought in the markets of the region. It's 52% area is accessible within 4 kms from metalled roads. The perishable commodities pour into the urban centre generally by the conveyances of rural transportation.

(iv) KARWI-REGION :

It includes the total area of Karwi and Mau tahsils, lying on eastern part of Banda plain and south upland gneissic plateau. It's 25.48% area is accessible within 4 kms of metalled roads. It is limited with Allahabad region in the east, M.P. in the South, Banda in the west and river Yamuna in the north. Its more inaccessible patches lie in the south on 'Patha Area' where the 'Col' of above 6 hours isochronic line passes. Manikpur lies on the tri-junction of rails so the

passenger and goods mobile to destinations sharply. The main line of Central Railway passes through it from south to north-east and east to west. here, the bullock carts and head-loads are the rural conveyances comfortable for carrying the woods and tendu leaves. The bi-weekly markets are 02 and the 28% of weekly markets to the total markets is prominent. It is an attracting feature of this region that the 'Kols'* of 'Patha' tract, loaded with fire wood come to the urban centres like Manikpur, Karwi, Atarra and Banda and after selling woods they purchase the things of daily needs and returned to their homes by train.

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* 'Kols' belonging to scheduled tribe, inhabited on forested 'Patha' or upland tract of Karwi and Mau tahsils.

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CHAPTER - 10

PROBLEMS AND PLANNING

The preceding chapters had analysed the various aspects of transportation at different areal levels. Among them some are such problems which prohibit the processing of interaction between the areas. These are denoted to be responsible for a sustained natural growth of economy and regional specification in the region. In a positive sense it is necessary to realise the hindrances in order to visualise their proper importance before suggesting an integrated plan for transport system to acquit from these obstructions. It is to be supplemented by the following matter.

PROBLEMS OF REGIONAL TRANSPORT

RAILWAY:

In the study region several types of transportational problems are experienced due to the undulating topography and backward economy.

In the rail network the following problems are remarked :

- (i) Unsystematic and insufficient growth of railways,

- (ii) Inaccessibility
 - (iii) The saturated capacity happens only on trunk line and nodes,
 - (iv) Defence requirements and
 - (v) Rail-road competition.
- (i) The rail transport came into operation during 1985 to 1987, and required by the people soundly, because of virtue of its growth during the last periods. But there is a keen fact that its construction was taken by the Indian Midland Railway Company and Indian peninsula Railway under government protection that had no proper view in regional outlook in certain stretches. It is a matter of thinking that there had not been sufficient grow in rail net.
- (ii) The matter as dealt within Chapter four obviously indicates that the region is well served by the railways oftenly every side, but a wide area surrounded by Orai, Jhansi, Banda and Hamirpur reasons possesses the greatest inaccessibility of the 'Col' of above 6 hour's isochronic line, caused by the rugged and ravined

terrain. The second patches lying along the Yamuna and north of Banda and Manikpur region is very inaccessible. These inaccessible areas possess such resources which have no need of rail transport for their development.

- (iii) As in Chapter V stressed that the saturated traffic is more densed in a few stretches and nodes like Jhansi and Manikpur lying on trunk, and main line render the whole line helpless in case of clearing the traffic. Such nodes are bottlenecks which should be removed by diverting the traffic to other lines by the full handling capacity with a long range view, is a universal problem of Indian magnitude.
- (iv) With the increasing traffic in rail-net the dacoiting, looting and subversing activities unlawfully happen into the train and arise a fresh problem for rail transport. In other view on the occasion of aggression the problem of quick transit military supply is originated and needs the railway more strengthened.

- (v) The railway faces a competition with road transport which run parallel to it. For this problem the solution is not as verdicted under the present scope of work but only be suggested that a committee should be taken into being for all geographical features before making a plan for future.

ROAD TRANSPORT

The road transport also experiences some problems, discussed as follows : -

(i) INACCESSIBILITY:

As we have discussed in forth Chapter that wide area having highest inaccessibility by road exists in the mid and surrounded by Orai, Jhansi, Mauranipur and Hamirpur regions. It is mainly because of ruggeed terrain and ravine land of Betwa and Dhasan. This part is solely detached from road transportation. In the plain the accessibility is fairly good, but few inaccessible patches such as along the Yamuna in the north, east of Lalitpur and the southern part of the area, are served by chiefly feeder roads.

(ii) UNBRIDGED . . . AND . . . POOR . . SURFACE-CONDITION
OF ROADS : -

Unbridged roads have also presented a sharp problem for the easy movement of passenger and goods. Owing to the scarcity of bridges the lacking points face a problem that obstructs to transverse movement. Generally, the surface conditions of roads are not satisfactory. On the Bundelkhand upland the condition is worst in the comparison of plains. The width of roads is also not sufficient as required for the easy movement of automobiles.

(iii) CO-EXISTENCE OF TRAFFIC : -

This is a problem of all over the country. There is no separated specified diversion of roads for specified modes of transport. So, they co-exist and obstruct to the sharp running conveyances.

(iv) PROBLEMS OF ORGANISATIONS : -

Various transport agencies are responsible for looking after the road-transport, such as, Public Works Department, is authorised for the construction and maintenance of roads and bridges, private and public operators running the conveyances, Regional Transport Authorities issuing licence, and police engaged in supervision

regarding enforcement of rules, are quite dis-co-operative from each other and no carefully attention was paid by them towards the integrated development of road transport as such.

(v) STATUTORY PROBLEMS :

There are some problems caused by legal restrictions. The free travelling is more restricted from one place to another, that is a legal prohibition, but on reverse it makes a problem. The differences in transport policies and taxes followed by states reflect such problems of transportation.

PROBLEMS OF URBAN TRANSPORT

The problems originated in urban centres are the mainly traffic-congestion, traffic noise, atmospheric pollution, road accidents, limited width, lack of classified roads, co-existence of traffic and network, dis-co-operative view of various organisations, requirements of road-side land unlawfully and severe construction of buildings respectively. Generally speaking the traffic congestion tends to be greatest in the centres of large towns and cities. The fumes which are emitted contain four main types of pollutant.

(i) CARBON MONOXIDE :

This is a poisonous gas caused as a result of incomplete combustion;

(ii) UNBURNT HYDROCARBONS :

This is caused by the evaporation of petrol and the discharge of only partially burnt hydrocarbons ;

(iii) OTHER GASES AND DEPOSITS :

Nitrogen oxides, tetraethyl lead and carbon dust particles ;

(iv) ALDEHYDES :

Organic compounds containing the group CHO in their structures.

PROBLEMS OF RURAL TRANSPORT :

Lack of bridges over the streams and having dusty and not good surface condition of roads are the main problems of rural transportation. In southern upland rugged terrain, steep gradient, winding roads missing bridges and small width are the problems, which acutely obstruct the transportation of that area. In the low-land Bundelkhand the rural roads are

better stretched than the southern upland. The main problems of low land rural roads are no repairing of roads and no release of public transport service.

SUGGESTIONS FOR IMPROVEMENTS

RAILWAY:

Holding the view of highly expensive nature of railway construction, the suggestions have given to rail performances, are of vital long term planning for numerous objectives. The following measures related with the improvements in rail transport seem positive for successful perspective planning and regional development.

(1) CONSTRUCTION OF DOUBLE LINE AND TO ENLARGE SOME BRANCHES :

From the very beginning, the region is well served by broad-gauge system, but because of lack of some requirements its intensity of traffic flow hindranced. Owing to great burden of passengers and goods the trunk line of Delhi-Jhansi-Bombay via Lalitpur and main lines of Jhansi-Kanpur and Allahabad-Bombay via Manikpur should be doubled so that the great traffic

flow can be easily diverted without any waiting and delay of trains. In other view of improving the rail transport for better is necessitated newly connection and enlarge the lines at important centres. The balance line of Ait - Konch will be extended upto Bhind. The new branch lines should be constructed from Kalpi to Hamirpur road and karwi to Sirathu (Fatehpur district) via Rajapur. Thereby the main advantages would be followed : -

- (1) The under developed and backward areas will be directly linked with the economically developed regions ;
- (2) Regional balanced economic development can be achieved by providing facilities of industrialisation;
- (3) During the natural calamities and jeopardy of the nation above all the supply of army and materials including foodstuffs will be facilitated ;
- (4) The traffic burden on trunk and main lines will be lessened with the addition of new branches;

- (5) With the emergence of new stations the some problems of unemployment can be solved.
- (6) The inaccessible areas will be reduced and the traffic from interior to the urban centres would sharply increased.

2. ELECTRIFICATION :

The electrification is need of time, therefore, it should be done over all lines of the region. Though Delhi-Jhansi-Bombay trunk line has been electrified, but the remaining other lines are lacking electrification. If the electrification of lines has been extended over the region, certainly the quick movement and high volume of traffic would be transhipped for distant parts through the study region.

ROADS -:

An attention was not paid towards roads upto 1943. But as Nagpur Plan came into being (1943), the measures for integrated Development of roads for the whole country stimulated.

The Nagpur Plan was an arising step for road-arteries. This plan was based on Grid

and Star Formula. Its main objective was the well connecton of every village at the distance of 8 Kms. from a main road.

fig. 10.1 shows the total milage of metalled and unmetalled roads required, based on 'Grid and Star Formula. It is obvious that in Lalitput district, there is great necessity of metalled roads than the existing. There is a strange fact that Lalitpur has greater area than district Jhansi but the existing metalled roads are lesser. Because Jhansi is the head-quarter of the whole region which contains a large flat surface than Lalitpur.

Besides these measures for road transport bridges are highly desired at bottle-neck-points, and for water transport proper attention should be paid. The ferries will be reflected with pantoon bridges, steamers and safed boats.

THE NEW PLAN :

It is evident (fig. 4.1A, 4.1B) that the vast area of the region is highly accessible, owing to the construction of metalled roads under Nagpur Plan, five years'-plan and Drought-Relief-Plan etc. After freedom a new plan for

BUNDELKHAND REGION(U.P.)

ROADS EXISTING AND REQUIRED

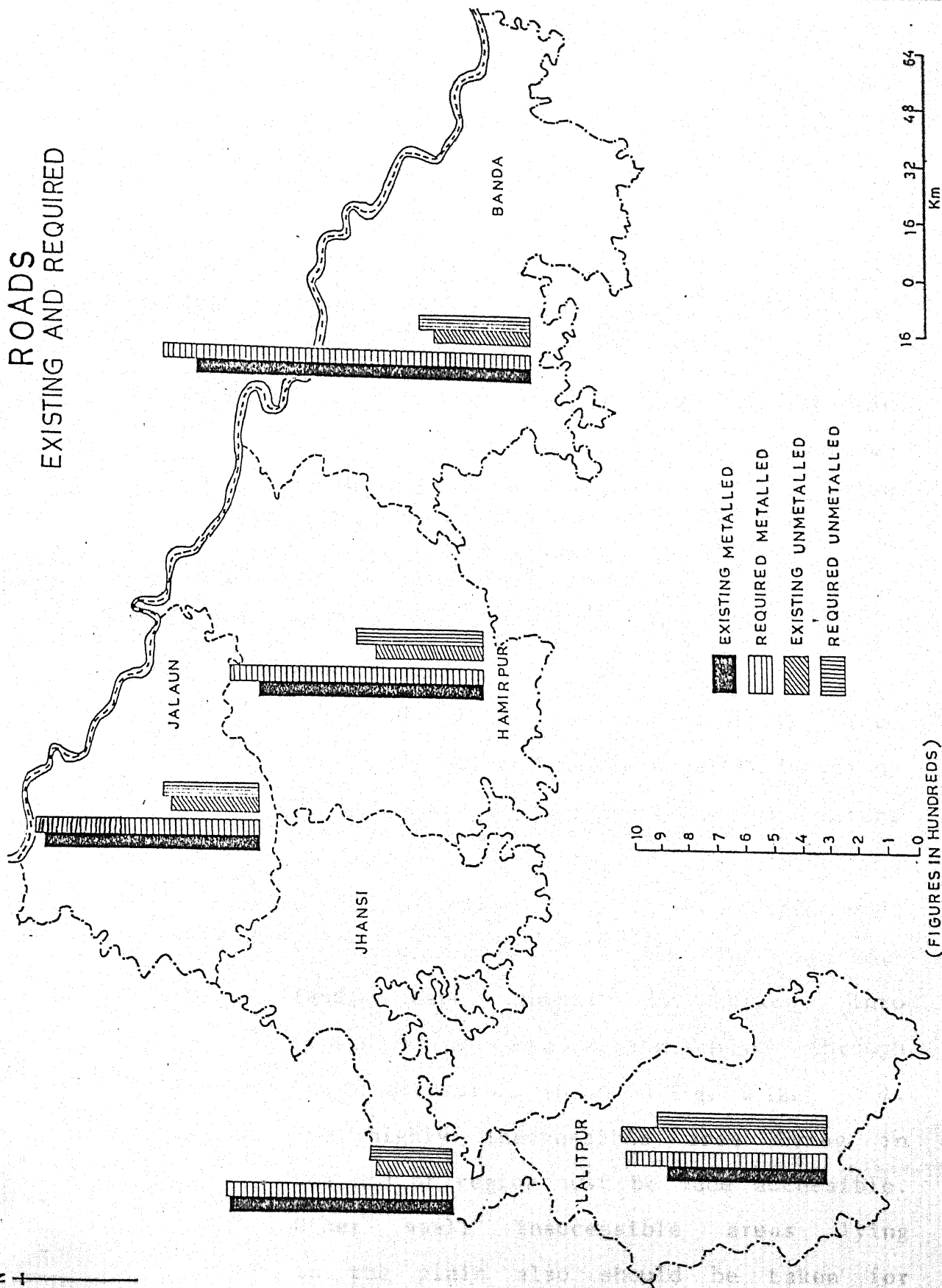


Fig. 10-1

twenty years came into existence, was significant for having requirements of planned economic development whose prominent features are as below : -

- (i) Every village should be within 5 Kms. of away from a metalled road.
- (ii) Every village having 2000 persons in the plain and 1000 persons in the plateau-areas should be connected by a metalled road.
- (iii) All industrial centres, pilgrimage and historical places should be linked with metalled road.
- (iv) The rail milage is not considered into total milage required, because the functions of two systems are varied in nature to perform the transport. The objectives of this plan are highly magnitued. In construction of roads in the low-land, care should be taken into consideration that they pass through the inaccessible areas (.Fig. 4.1B.). The highly inaccessible area lying in the mid of region must be made accessible. Other small inaccessible areas lying in the plain also should be taken for special construction of new roads. Further

more, the semihilly southern upland that represents the line of least hindrance must be improved and maintained in at least jeepable or semi-motor condition.

The widely spaced road bridges on the main streams of Bundelkhand such as six on the Betwa, three on the Yamuna and single bridges are mounted on Dhasan and Ken rivers. Therefore, the construction of major bridges* at suitable places (fig. 10.2) like Deogarh, Raj ghat, Mata Tila on the Betwa, Kotra, Gurha on the Dhasan, Pailani on the Ken is essential. Bridges over the Yamuna at Chilla, Augasi, Dado and Rajapur would also be much helpful for intra and inter-regional transport.

ROAD SURFACE AND ROAD WIDTH :

This problem is not only of Bundelkhand but it is universal. The roads are congested more, due to the highly volume of speedy vehicles. The road width which was economically confined at beginning is still persisting on. Since then manifold increasing of automobiles that are plying on the roads came into light. Such increasing of vehicle-numbers on roads is dangerous for future human lives. Stamp stressed on this problem, 1. There are 25 bridges, which have been proposed to construct on various lacking points over the various rivers of the study region.

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"there is indeed a danger that the world will be over populated by automobiles long before it is over populated by people.¹

Thus it is clear that road plan should be evaluated as long range view. Some measures solve this problem of high volume of traffic on roads, as by thorough widening of roads and to some extent by straightening and constructing by-passes where nodal points exist through the urban or rural areas. Besides these short term measures, there is another scheme for shortening the pressure of traffic on roads, that is the construction of up and down lanes along the highways. One lane system along the National Highways throughout the country is admirable; but in practical purpose at least two lanes system is necessary in the areas of high traffic density. This suggestion hardly stayed for some time. The suggestion of two more up and down lanes given to such condition specially when the number of vehicles steeply rise in the one hand and co-existence of slow-moving carts, pack animals and fast moving lorry, buses and cars on the other.

There are other usual rules as no stopping on the actual highway, provision of adequate 'laybys' where traffic can draw off. There is

the question of dazzle at night and hence the desirability of a central verge. A dead straight road with long straight fence on either side produces a feeling of monotony which is not only undesirable aesthetically, but causes sleepiness among drivers, resulting in serious accidents. In any case road junction must be reduced in number to a minimum, the existing roads being taken under the new high-ways². For present, such rules must be enforced which prevent construction of buildings along major roads.

As early stressed that road transport faces the acute organisational problems. For proper development of road transport, the close-co-operation is essential between P.W.D., Regional Transport Authorities and Police Departments. For observing, governing and co-ordinating, there is essential a flying-squad department. By the co-ordination existing between Transport and P.W.D. with its personnels the conducting of traffic and surveys to appraise the present need and planning for future can be gained. In fact Public Works Department conducts some surveys, but they are not enough for broad and future planning. Indeed, it needs proper

survey and analysis released for road transport. The surveys of volume of traffic indicate the total traffic at different points of a road. The suveys of commodities flowing on different routes be made and the new roads must be constructed according to significance of commodity.

If the attitude of different organisations is dis-co-operative the traffic is generally interrupted during the rains, when the roads either eroded or subsided at some patches. On the other hand owing to its lack between Regional Transport Authority and Police Department, the transport becomes costly. As it generally minded that inter-regional moving trucks can not pass through the road, unless paying something to the traffic policy enroute, which is authorised for rules enforcement. By this bad practice the traffic flow hostily affected, and the roads tear, because overloaded vehicles ply on them.

The statutory problems also obstruct the natural traffic flow. Administrative transport regions as Jhansi and Banda in study area do not pay a keen attention towards time, costs, nature and direction of traffic circulation, which is needed more for transportation. As above stressed that free movement of vehicles

from one place to another is strictly prohibited owing different policies followed by them. The relaxation that without any consideration of carrying capacity of the conveyances and the surface condition of roads on which they ply, the permissible laden weight limit is fixed, is more dangerous for economic body of the traffic. So the statutory problems should also be modified according to infrastructure of traffic.

URBAN TRANSPORT :

Generally, the roads in the urban centres are narrow and nodes are quite common. So, increasing the width of road is prime necessity of cities. For better traffic flow only roads not should be widen, but their four elements viz., the travelled portion, traffic separators, kerbs and road margins also be taken into consideration.

As suggested for National Highways that the paths for different types of vehicles should be separate as may possible. Such suggestions for compactly build up cities are not so easy in implement. It is a duty of municipal authorities to divert the illegally road side requirements of land, as well as necessitates for a requirement of road width in that areas, which are developing in future. Similarly, there is a fact that

according to local situation of city morphology the diverting roads, enforcing traffic rules, creating proper crossings and providing over or under bridges etc., should be under considered for construction. For efficient city transport the following measures are needed, keeping in view the morphology and economic settings of towns : -

- (i) The road arteries based on a pattern of radial concentric system; with a portion of orbital routes acting as by-pass around the city should be existed for intracity movement of speedy vehicles.
- (ii) The design of streets or roads should be constructed according to category of function.
- (iii) The adequate space for parkings should be constructed on the nodes.
- (iv) On road side the parking of heavy traffic should be strictly forbidden.
- (v) The Prime highway passig through the city should be designated.

- (vi) The speed-brakers should be constructed on steep gradient roads and at proper points of existing roads.

The radial concentric system similar to Zaborsky³ Plan is more practicable with some modifications for old cities like Jhansi. In Jhansi; for example, the National Highways 25 and 26 in combination with the Khander-Minerva-Baragaon-Gate-road may easily function as the circumferencial, while the Bundelkhand-Degree-College-Elite-Saiyar Gate crossing-Risala Chungi Chauki Road may serve as the inner loop with B.K.D. - Elite - Jail crossing, Khanderao Gate-Elite-Kacheheri- Minerva-Manik Chowk-Elite and Sagar Gate-jail roads as radials, suggested to a need of improvements in view of their respective functions. Finally the organisation of various administrative departments like municipality/Corporation/Town Area viz; water and Power supply, roads and building construction, vehicle licensing and traffic police etc. should be co-ordinated, so that the function of urban transport may be done easily without any hindrance. Besides the departmental co-ordination, a mention should

be taken into account of making a separate department, working under the supervision of traffic surveys and traffic planning. Making thus, the urban transport system will be rapidly brightened.

RURAL TRANSPORT :

By the above stressed plans (Nagpur and the new) the distant villages could be bring within 5 kms of a main road. But now remains more far doing as most of villages are far away and some are physically near, feel the lacking of feeder roads and small bridges for their poor and thin movement. Lacking of feeder roads and bridges are the severe problems. These problems can be remoted by the new 20 years Plan, canal road construction and establishing industry in those lacking rural areas. These are tackled as below : -

- (1) The new plan emphasises on construction of feeder roads with care taken to construct the loop roads.
- (2) Now the canal roads are not allowed to rural traffic flow. Although these roads are most advantageous to the rural

lives, because canals often follow the water-shed line and are naturally free from flood during the rainy season. In this regard the effort of Labour Bank* by the Planning Department would be very helpful in maintaining these rural roads.

- (3) If in the rural areas industrialization should be done carefully, then the construction of feeder roads emphasisly may be needed for economic industrial development. In rural areas the carts are only means of transport, so they should be provided with pneumatic tyres and boll bearings. By providing such the time and cost of movement will be saved and roads less fricted.

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* Labour Bank' is the scheme, presented by the Government, under which every villager necessarily contribute one day manual labour or one day wage to Gram Sabha for the maintenance of rural roads and other purposes.

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